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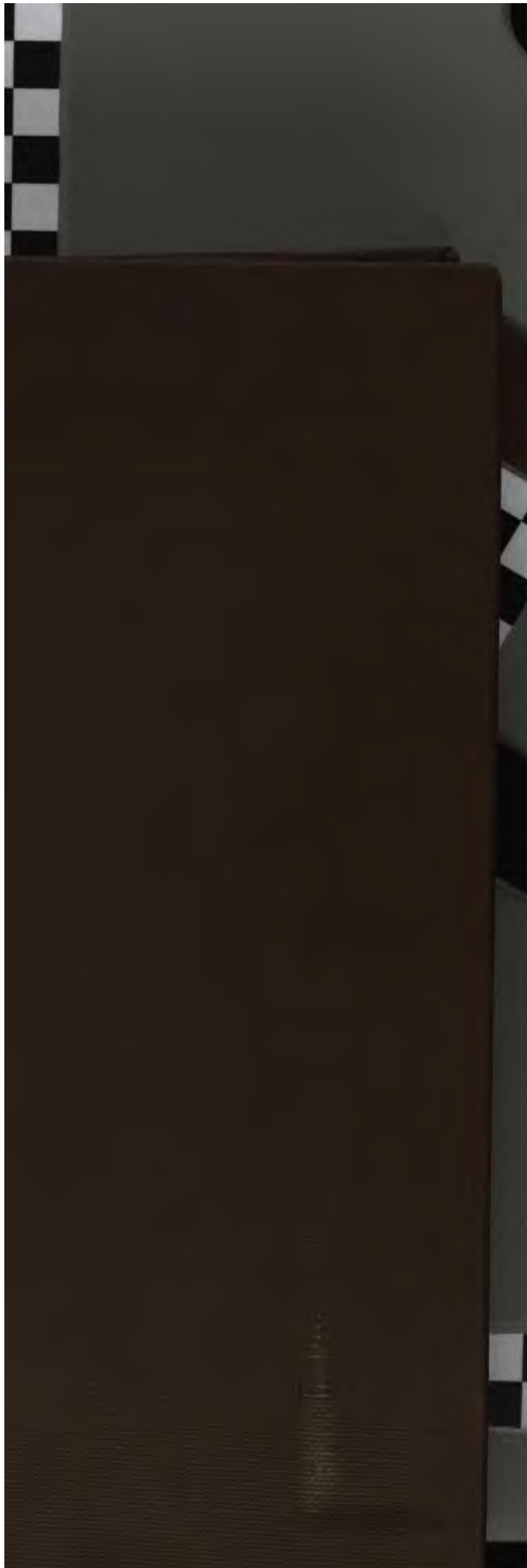
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STEVENS' Indicator

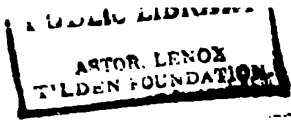
* Stevens' Institute of Technology *

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THE

Stevens Indicator.

Vol. I.

HOBOKEN, N. J., JANUARY 15, 1884.

No. 1.

The Stevens Indicator.

PUBLISHED ON THE
15th OF EACH MONTH, DURING THE COLLEGE YEAR.
BY THE STUDENTS OF

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BUSINESS EDITOR,	R. H. RICE, '85.
EXCHANGE EDITOR,	C. D. BOYNTON, '85.

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A. P. KLETZSCH, '84.	
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Professors, alumni, undergraduates, and friends, are invited to contribute literary articles, items, verses, discussions of current topics, and personal notes.

It is particularly desired that Alumni furnish us with all items of interest concerning themselves and every one who has been connected with the Institute.

It is expected that all articles shall be written in a courteous tone.

The writer's full name, as well as his NOM DE PLUME, must accompany the article, as assurance of good faith and reliability; but it will not be published, unless desired.

The editors do not necessarily endorse sentiments expressed except in the editorial and exchange columns.

Publishers are invited to send us books and magazines for notice or review.

Exchanges, contributions, subscriptions, advertisements, and all other communications by mail, should be addressed to THE STEVENS INDICATOR, Stevens Institute, Hoboken, N. J.

All persons wishing to secure the business patronage of students and alumni, will find it to their advantage to send for our advertising rates.

THE initial number of THE STEVENS INDICATOR, which we herewith present to our readers, requires but a few words of introduction.

The Institute enjoys, at present, a period of unusual prosperity; it has now achieved a truly national reputation, and is recognized, *par excellence*, as the leading school of its class—the result of a decade of unremitting labor on the part of those to whom the management of its affairs were so fortunately intrusted. The attendance is larger than at any previous period, and, from present indications, promises to remain so for some time to come.

During a number of years past Stevens has had most of the features which go to make up modern college life; it has long had its societies and clubs, and baseball, football, and other athletic sports have been developed to a certain extent. Our annual, *The Eccentric*, has long been recognized as one of our permanent institutions; but we have been compelled to forego the luxury and convenience of a monthly college paper, which constitutes so essential a factor in the undergraduate life at most of our important colleges. It was evident to many for several years past that Stevens was sorely in need of such a paper; some medium was wanted to express the current sentiments of the students upon matters connected with the curriculum and discipline of the Institute; some means of bringing the various athletic and other interests more prominently to the notice of the college world, and of correcting erroneous impressions which occasionally go abroad. The Institute has a constantly and rapidly growing list of alumni who now hear and see but little of the progress of their *alma mater*, and whose interest is rapidly cutting adrift from the as-

sociations of their college days. A professional school like ours, whose reputation so largely depends upon the manner in which its graduates endorse its methods, cannot afford to allow them to become wholly disinterested in its work. Again, the friends of Stevens constitute a community which is more or less directly interested in all that occurs at the Institute—an interest which is certainly worth cultivating.

The time, then, has long been ripe for just such a paper as we now take pleasure in presenting to the community in which we live; and we trust that, to all who have the interest of Stevens at heart, THE INDICATOR will at all times prove a welcome visitor.

There can be but one opinion, however, as to the conditions under which such a paper can be made a success; it must have the cordial support, both financial and literary, which Stevens and its friends can afford. We are not deceiving ourselves as to the difficulties which will arise and possibly thwart its success; we fully realize, on the other hand, that there must be no chance for failure, because, if the paper does not succeed now, it may be years before another attempt will be made. We know that a paper like this requires an expenditure of time and labor which we can ill afford to give; our legitimate college duties, already arduous, are constantly growing from year to year, and leave but little time for outside issues of this kind; yet we are willing to devote to it much time which would otherwise be devoted to recreation, trusting that all who can will bear with us in the work.

We do not hope to revolutionize the destiny of Stevens; but we are free to confess that we look for some good results to our *alma mater* from our journal. THE INDICATOR will surely reach, among others, a class of readers which, for several years past, has become quite a source of supply for our upper classes, and which the authorities have always and very wisely encouraged. We refer to those graduates and upper classmen from classical and other colleges, who come to Stevens for a post-graduate

course. To them THE INDICATOR will be the means of affording an insight to the condition of affairs as they actually exist, and which even by reading between the lines of the Annual Catalogues or Announcements they could not discern. Everybody who has had any experience at all, places little reliance in the statements of college catalogues, and we know that our own comes in for a share in the general prejudice with which literature of that class has come to be regarded.

To those, as well as to new men about to enter as Freshmen, a perusal of THE INDICATOR will prove a valued means of estimating the real merits of Stevens; and we shall indeed be greatly mistaken if THE INDICATOR will not bring many such men to our halls, for by the system of exchanges, it will doubtless find its way into every important college in the land.

We hope that our readers may be lenient enough to overlook any defects which may become apparent in this, our initial number. We have yet to acquire experience and judgment in journalism; when we have that, we shall hope to have molded THE INDICATOR in accordance with the needs and wishes of the community for whose benefit it has been designed.

NOW that the football season has ended, and Stevens has shown her mettle by taking the first place after Yale, Princeton and Harvard, we have a long rest until the middle of April, when the baseball season will begin. In the meantime, we are very much crippled by having no gymnasium, and for this very reason we should make a more strenuous effort to keep our place in the college arena. In baseball we shall doubtless be able to do something; but it should be remembered that for two years Stevens has not been represented in the Intercollegiate athletic games. If we are not represented this year, we lose our membership. This must not happen. We *must* be represented; and, to be able to select the men to enter we must have a Spring Athletic

Meeting, among ourselves, about the latter part of April. We have plenty of men to pick from and make a fair show, if some one or two will push the thing ahead. "We" will try and interest all by keeping the subject well ventilated before them, in our editorial columns and elsewhere. Let us remember that all the colleges of any importance have their Field Days. Enough gate money will be taken to pay for medals for each event; and thus an object can be placed before the contestants. Don't let Stevens be eclipsed, but make her shine even more brightly than the rest.

THE *Michigan Chronicle* makes the score of the game between their football team and ours 17 to 5 in their favor. In another column they publish a letter from Stevens placing the score at 5 to 1 in favor of Stevens. After commenting on the incorrectness of the score in the said letter, in their editorial columns, they remark that "in accordance with the final decision of the referees, we were beaten in every game played." Consistency seems to be a rare jewel with the *Chronicle*. We would refer them to "Football Records of American Teams," by Walter Chauncey Camp, where they will find official record of the above game, with a score of 5 to 1 in favor of Stevens.

ON Thanksgiving Day the Stevens Institute foot-ball team closed one of the most successful seasons of foot-ball that have crowned their efforts since the introduction of the revised Rugby game.

Before 1876, the foot-ball matches of the different colleges were governed by the American Association rules, which allowed no running with or passing of the ball, and no tackling whatever. While governed by these rules the Stevens team had not only played good matches, but succeeded in downing several of her strongest opponents.

With 1876 came the change by which the more exciting Rugby game of foot-ball was substituted for the American game; and in the

year following it had been adopted by nearly all the colleges playing foot-ball. But the old success was gone. Stevens no more succeeded in piling up scores on her rivals, and, from year to year, the foot-ball matches at the cricket grounds lost their interest, so that it became almost an impossibility to put an eleven in the field. Then came the disastrous seasons of '80 and '81. In the latter year, our weakest opponent for many seasons succeeded in tying us.

The foot-ball team that season was completely demoralized, and the college support had dwindled down next to nothing. The remark, that to play another game would only add another defeat to our already long list, was frequently heard. Stevens had good men in those days, better athletes, stronger and larger than at present, and the advantage of a good gymnasium, which we never missed more than during the season just closed. Faults were everywhere, the captain complaining of the team, the team of the students, the students of the faculty, and the faculty especially of the team.

The members of the Athletic Association, after having elected the foot-ball captain according to the bad system by which he is now chosen, thought their work done. From the Board of Directors he received little or no support, and from the faculty still less, until the life of foot-ball at Stevens Institute was nearly extinct. However, what use of complaining. Useful suggestions and restoratives were promptly applied, and with the aid of '82's season and of class captains of '84 and '85, life again manifested itself with renewed vigor; placing the college team upon that successful footing with which the season of '83 has closed. The season of 1882, as for college matches, might have proved a more successful one had more games been played. The captain must have lost all faith in his team, otherwise he could not have suffered such good ability and material to lie inert.

It again looked gloomy for the season of 1883 by the loss of four players, instead of one, as was first expected; but the majority of those

remaining were bound to wipe out the defeat which under unfair circumstances had been administered to them the year before. Accordingly, the players went to work with a will, began practicing early, being two weeks ahead of any other college, and on the 29th of September played the first match. The players, however, were not in a fit condition to tackle stronger colleges, owing to the want of gymnasium practice. The Board of Directors, under the circumstances, prescribed the best in their power, requiring each member to conform with a course of training, which, if strictly adhered to, would certainly have proved still more beneficial.

On October 6, we played Yale at New Haven; during the first 20 minutes of the game she did not score on us. Unfortunately for us, our captain and another player were disabled in the middle of the first half; still the team succeeded in playing, during that time, one of the best games which has been played with Yale during the present season. In the second half the team, without any one to encourage them, played loosely for a time, and, aided by these circumstances, Yale succeeded in making the greater number of the 48 points, and nearly one half the points scored against us this season. A second game with Yale was unwisely declined. It was solely the match with her team that made our team. What we afterwards gained was through the hard and persevering work of our players, and we showed our gratitude to Yale at her two closing matches on the Polo grounds.

Stevens' first game with Harvard was next played at home, and we succeeded in scoring two touchdowns against Harvard's three, two of theirs yielding goals. Though this game was played in a drizzling rain, it was pronounced by the spectators as one of the finest foot-ball matches ever witnessed. Their gentlemanly conduct during the entire play was warmly commended, both by spectators and players.

October 24, we played Princeton for the first time, on our own grounds. Aided by the wind

and referee, she succeeded in scoring two field goals and one touchdown in the first half. In the second half the wind had nearly died out, and with the sun in the eyes of the home team, we fought gamely. Princeton succeeded, and allowed by the referee, in making an unfair touchdown in this half, by taking the ball from one of our half backs as he was about to make a safety. Yale's rough playing was nowhere compared with the roughness and meanness of this game. The *N. Y. World* of October 25 only partly describes it in the following article:

"The Princeton men played with the greatest roughness, and throughout the game took advantage of their superior weight to knock their antagonists about most unmercifully."

October 27, we played Columbia, and defeated her in a love game of 19 to 0. For their defeat a poor excuse of having seven substitutes on the team was given; but we afterwards noticed eight of the same eleven playing against the University of Pennsylvania and Yale.

Next on our list came Lafayette College, at Easton, Pa., Nov. 3d. Two of our men were unable to play in this match, and our regular substitutes had withdrawn from foot-ball a few days before. We went with the expectation of being beaten, but succeeded in defeating the Lafayette men by a score of 14 to 4. It was in this game that one of our half backs made one of the longest drop-kicks on record. We were no little surprised at the ignorance displayed by the referee of some of the rules, especially as regards off-side.

November 6, we journeyed to Cambridge to play our return match with Harvard. A strong wind blew diagonally across the field, and though we were aided by it, but worn out by the long ride, Harvard, in the first half, succeeded in scoring nine points to our two. In the second half the wind was against us, and as usual our team played a better and stronger game. Harvard only added two more points to her nine, and acknowledged, though aided by the wind, that she was outplayed in the last three quarters; the final score being 11 to 2 in Harvard's favor

November 20, we played Seton Hall. It was a one sided and uninteresting game, the final score being 60 to 0 in favor of Stevens.

November 24, Lafayette played her return game with our team, on the Cricket Grounds. The ground was wet and very slippery, and good plays were at a premium. In all, Stevens made four touchdowns, of which but one yielded a goal, Lafayette scoring a touchdown from which a goal was kicked, and a beautiful drop-kick from the field giving her a second goal, the final score being 14 to 11 in our favor. The last two matches were played with the University teams of Michigan and Pennsylvania, respectively, and are described at length in another column. With the latter game the season closed. As regards success and standing, we refer to our record in comparison with those of other colleges, which justly entitles us to first place amongst the non-association teams, which position has been assigned to us in the Foot-Ball Records of American Teams.

Let us hope that the success which we have attained is but a start toward the position which Stevens will hold amongst other American colleges.

SINCE there is always a great deal of cheering done when foot-ball is played, this may be the right place to call the students' attention to the fact that we are anxiously waiting for some enterprising genius to propose a new cheer; it would be well received if it is good. Let it have some mouth filling and terror inspiring vowels and consonants in it, O's, R's, U's, etc. Every political house or one-horse chowder club has adopted the fashion of spelling out its name, and it is time that our old cheer should be dropped.

PROF. (*Hearing a recitation in physics*):
"Mr. Blank, what is absolute zero?"

MR. BLANK: "Not prepared."

PROF. (*Suiting the action to the word*):
"Correct."

WHEN the Board of Editors of THE INDICATOR organized and started on the several duties which devolved upon them, it became evident that it would be impossible to edit a monthly paper and look after the property of the same, in a manner at all resembling business, without some kind of an office or editorial sanctum. There being no unoccupied space in the college building which could be used for that purpose, it was decided to look among the boarding houses for a room. This proved unsuccessful; and, as a last resort, we asked Prof. Carr to let us use part of his office. He consented willingly, allowing us all the privileges that we could desire; and we take this opportunity to thank him heartily for his kindness. President Morton also showed us a great deal of kindness in fitting up our quarters for us.

SKATING WITH THE GIRLS.

Come girls, get on your jockey hats,
Dress in your skating suits,
Be sure to lace up snugly
Your pretty little boots;
And we will all go skating,
For the ice is clear and bright,
The moon will soon be up, my dears,
We'll have a lovely night.

Then soon we're off, a little hand
Tucked snugly 'neath each arm,
While all the boys are making love,
And keeping darlings warm.
Oh! don't you think it's jolly
Mixing up one's self with curls,
And going off on moonlight nights
Skating with the girls?

But when it comes to putting on—
Lord, love us! ain't it nice—
To hold the darling's little foot
You have to be precise,
Or the skate won't fit so snugly;
So with many twists and twirls,
How long it takes in putting on
The skates of pretty girls.

The foot's so small, so very trim,
The boot so high and neat;
Perhaps a glimpse of stockings then
May cause your heart to beat.
It takes so long to put on skates
Of pretty ones with curls;
And yet we wish we always could
Go skating with the girls.

STEVENS' FOOT BALL RECORD FOR 1883.

Stevens' record for this fall will be long remembered as one of the most—if not the most—successful season's work since the game began to be played by our students. When it is taken into consideration that our total number is about one hundred and fifty, and that the team must be chosen from this small number, the record of games won is something to be proud of. We think that if the chosen men could have some place for indoor exercise on stormy days, the pleasing record of this season's work could be repeated next fall; even although we lose four or five very good men next June. The management of the team this year has been all that could be desired, and showed a decision which was very beautiful in its effect.

The team was notified early in the fall, what was expected of them, and what restrictions were placed on their diet and other incidental pleasures; and nobody can deny that the physical condition of the team was better than ever before. This indiscriminate smoking, and eating greasy stuffs and pastry must become a thing of the past, now that its evil effects have become so plainly apparent. The faults of the team cannot be passed over. The most grievous of these, and certainly the most hurtful to the reputation of Stevens, is the bad taste of all trying to talk at once when a disputed point comes up. They certainly would not do so in a ladies' parlor, and why should they do in a foot-ball field, what they would all consider disgraceful anywhere else? Unfortunately for us, this fault has been generally noticed, and detracts from our otherwise good reputation. Let us turn over a new leaf, and next year put the quietest team of all in the field; it will help us in every way.

The new system of counting by points is to be commended in every way, for it not only helps to prevent ties, but it gives the uninitiated an idea of who won; because he can see by the score, who has the greater number of points.

SUMMARY.		Score by points.
Sept. 29.	Brooklyn Polytechnic vs. Stevens...	0 59
Oct. 6.	Yale vs. Stevens.	48 0
" 20.	Harvard vs. Stevens.	14 4
" 24.	Princeton vs. Stevens.	14 0
" 27.	Columbia vs. Stevens.	0 19
Nov. 3.	Lafayette vs. Stevens.	4 14
" 6.	Harvard vs. Stevens.	11 2

Nov. 20.	Seton Hall vs. Stevens.	0 60
" 24.	Lafayette vs. Stevens.	11 14
" 27.	University of Michigan vs. Stevens..	1 5
" 29.	University of Pennsylvania vs. Stevens.	6 6
Games won by Stevens.		6
Games lost by Stevens.		4
Tie games.		1
Total of points gained.		183
Total of points lost.		109
Points gained, over points lost.		74

UNIVERSITY OF MICHIGAN vs. STEVENS.

HOBOKEN, Nov. 27, 1883.

The game between the team from Michigan and the home team was well played, and showed very plainly what Stevens can do if she tries. The Michigan team was decidedly heavier than the Stevens eleven, and to an outsider appeared to have a decided advantage in point of size and weight. During the game, the Michigan men proved themselves remarkable runners, beating our men, with one or two notable exceptions, every time the occasion demanded a race, and if the visiting team had possessed a better knowledge of the game, the score might have been different, although it is but fair to suppose that if our team had been pressed harder, they would have worked harder. The weather was all that could be desired, a little windy, perhaps, but then the boys work better when it is a trifle cold.

The game was called at 3.11 p. m., Stevens losing the toss, having to play the first half against the wind, and Michigan, what little sun now and then flashed out from under the clouds in the south-west.

Bush put the ball in play by dribbling it and passing it to Cotiart, who tried to run with it, but was stopped before he had run twenty feet; then followed a succession of downs very close together, but yet sufficiently far apart to allow Stevens to retain the ball in her possession. Jones soon had the ball, and made a magnificent run toward the opponents' goal, but in the next down it was brought dangerously near our home. Kletzsch stopping the Michigander by a beautiful tackle, turning the holder of the ball around about three times, and finally seating him on the ground conveniently near, so that in case he desired to run or to pass the ball, he could be stopped. The visitor had, however, no such desire, and yelled "down." Then fol-

lowed three downs for Michigan, which gave the ball to Stevens. In the next scrimmage, through some unexplained fact, one of the opposing team kicked the ball, and sent it flying over our goal line. Away rushed both teams for the ball, but Michigan got there first and held the ball. Immediately there was a long discussion as to whether it counted a safety for Stevens or a touch down for Michigan. Finally, the referee, a Mr. Hildreth, from C. C., N. Y., decided that it was a touch in goal, although he afterwards, in the second half, changed his decision, and decided that it was a safety for Stevens.

The ball was then kicked from the 25-yard line by Bush, and stopped by one of the Michigan team, who tried a goal from the field. The ball went flying over the bar and between the posts, but the kicker having neglected to allow the ball to touch the ground before kicking it, it had to count as a "punt" only, although it was a very good attempt. The ball was again put in play from the 25-yard line. Michigan got the ball, but after a few very bad fumbles, it passed into the hands of the home team, and then Wurts started on one of his famous runs, gaining sixty odd feet and then passing the ball to Cotiart, who carried it still further into the opponents' end of the field. During the game Jones made some splendid kicks. Time was then called, and ended the first half.

The second half was started by Michigan adopting our tactics and dribbling the ball. Wurts got possession of the ball, and by one of his splendid and telling kicks sent it far toward the Michigan goal. By a dint of magnificent tackling and running Stevens got the ball close to Michigan's goal, and then, by watching his opportunity, Wurts kicked a goal from the field. Jones caught the ball when it was kicked out by Michigan, and tried for a goal, but missed. The ball was then worked by Michigan well down toward our goal. Wurts captured the ball and ran with it, almost crossing the boundary line before he kicked it, sending it flying toward Michigan's goal, but as the referee decided that he went outside, it had to be brought back and played over again from the line. After this, bad fumbling on both sides was the order of the day. During the scrimmage that followed, both Torrance and Jones did some remarkable tackling and running, frequently arriving just in time to prevent a great gain by the visiting team. Several times during the game a great big Michigander would reach over the strug-

gling lines and catch hold of Baldwin's wrist just as he tried to pass the ball to our half backs, thereby compelling us to lose ground. Cotiart distinguished himself in this half by his good tackling and general promptitude in "getting there" just in time. The ball was at this time about midway in the field on one side, and during a scrimmage a Michigan man got possession of the ball, and carried it over our goal line, the Stevens team making no attempt to stop him—as the referee declared it was a foul—and stood still, waiting for the referee to call the ball back. For a while, however, he seemed to have no such idea, and it was only after some time had been lost, and lots of arguments for and against it had been made, that he called back the ball to be played from where the Michigan man had picked it up. Meanwhile, noticing that the two Michigan men who had the ball were doing some very funny gymnastics with it, one of the students of Stevens went down to see what they were doing, and on asking the question, was told that they were "making touch downs." Time was then called, and the game decided for Stevens—5 to 1.

Michigan—Goals, 0; touch downs, 0; safeties, 0.

Stevens—1 goal from field; touch downs, 0; safeties, 0.

TEAMS.

University of Michigan.	Stevens.
<i>Rushers.</i>	<i>Rushers.</i>
ALLCOTT, Capt.	KLETZSCH, Capt.
BEACH.	COTIART.
BEACH, E. E.	BURHORN.
BITNER.	BUSH.
KILLILEA.	DILWORTH.
WRIGHT.	TORRANCE.
PRETTYMAN.	WILLIAMS.
MOORE, Half Back.	WURTS, Half Back.
GEMMEL, Half Back.	JONES, Half Back.
MCNIEL, Quarter Back.	BALDWIN, Quarter Back.
GILMORE, Full Back.	CAMPBELL, Full Back.
<i>Umpire.</i>	<i>Umpire.</i>
H. S. MAHON.	E. MUNKWITZ
<i>Referee</i> —Mr. HILDRETH, C. C., N. Y.	

UNIVERSITY OF PENNSYLVANIA vs. STEVENS.

HOBOKEN, Nov. 29, 1883.

The game between the above-named teams was one of decided interest, both because it was our last game this season and on account of its being the closest game Stevens has played this fall. As always seems to be the

case, the opposing team appeared to have the advantage in weight. The day was perfect for the game, although the ground was rather slippery and apt to be treacherous to the players.

Game called 10.50 a. m., after deciding to play half-hours instead of three-quarters.

Stevens won the toss, taking the wind, which was blowing rather briskly.

Pennsylvania put the ball in play by dribbling it and passing it to the right end rush, who carried it almost across our goal line. After the next down Jones made a beautiful run, carrying the ball well into the centre of the field. In the next scrimmage Wurts was deliberately and maliciously run into, and his ankle hurt. We say deliberately, because Beck, of Pennsylvania's team, was overheard to say, "We must injure these half-backs if we want to win this game." However, Wurts was not hurt enough to prevent his playing. Jones then tried for a free catch, but was interfered with. The referee, however, gave Jones the right to a free kick. Baldwin now commenced to show up to good advantage, kicking remarkably well. In fact, for the next ten minutes Stevens did some very good running, and tackling to such good effect that Bush soon scored a touch-down which yielded a goal. This touch-down, and the manner in which it was made, was one of the main features of the game. Cotiart and Torrance both did very good work in getting the ball over our adversary's goal line.

After this the ball stayed very close to Stevens' goal; in fact, so close, that after three successive downs, Pennsylvania had not advanced or lost enough ground to retain the ball, and therefore it passed into our hands. Baldwin kicked the ball, after allowing it to pass over a third man's foot. After a short tussle Wurts got the ball and made a good run well up to Pennsylvania's goal, and then kicked it further, so that for a short time the contest was almost on top of our opponents' goal line.

Shortly after, while running to get the ball, which had been kicked outside by Pennsylvania, Bush was interfered with and pushed aside, thereby causing him to fall and injure himself, so that he had to withdraw, Burhorn going on as a substitute, and Dilworth playing the downs. Immediately after the next down Jones had an opportunity for a free kick, and sent the ball flying toward our opponents' goal, but which was caught by one of the visiting team, who in turn had a free kick.

Then followed a touch in goal for Pennsylvania. The ball was kicked out by Klettsch. Cotiart followed up the ball by one of his runs, and supplemented it by a tackle which brought the holder of the ball down in a lively manner.

In the next scrimmage a man was hurt on the Pennsylvania team. Pennsylvania got the ball, and having a clear field, with the exception of Maury, it seemed for a moment that a touch down, and possibly a goal, would be scored; but Maury saved us this by bringing the man down in a manner more forcible than was consistent with gracefulness. This placed the ball about thirty feet from our goal, and in the next tussle, by a series of good passing and kicking, and also by an act of the grossest interference, our visitors succeeded in making a touch-down, which yielded a goal. Klettsch succeeded in getting the ball almost immediately after it was kicked out, and started on one of his telling runs, bringing the ball well up to Pennsylvania's goal. For the next few minutes the fight was sharp and strong, but with the evident advantage on Stevens' side.

Time was then called, and this ended the first half.

In the second half Baldwin put the ball in play by dribbling and passing it to Jones, who kicked it far down the field. Pennsylvania then got possession of the ball, working it well up to our goal. However, it was soon brought back, and our visitors began to lose ground, although working hard. In the next few minutes both Wurts and Jones made splendid free kicks. Bad fumbling then seemed to be the order of the day for Pennsylvania. As may be imagined, Beck, of Pennsylvania, who used to attend Yale, lost no opportunity to carry out the idea that he had expressed to his associates, namely, that of injuring our half backs, and at the first opportunity threw himself on Wurts while he (Wurts) was lying prostrate on the ground, although Wurts had called "down" quite some time before Beck came up to him. For the first time since he had been playing with Stevens, Wurts got angry, and gave Beck some merited punishment. Then followed, in rapid succession, two free kicks by Wurts, and a most magnificent run and tackle by Klettsch, who now began to make up for some bad play he had made in the early part of the game. After the next down, Torrance came to the front by catching and bringing down his man in his usual prompt and effective way. Seeing the necessity for harder work,

if they wanted to win, Pennsylvania now did her level best, but was met by just as determined a resistance as the effort they had put forth, so that nothing was gained or lost, only the position of the players would change from first one end of the field to the other. Finally, Pennsylvania made a foul pass, which put the ball in Stevens' hands, and from that moment our boys commenced to do better work, gaining considerably on their opponents, and forcing the ball dangerously near to their goal. Before any good could come of this hard work—for it was hard work—time was called, thus leaving the game a tie, which was not played off.

TEAMS :

University of Pennsylvania.	Stevens.
<i>Rushers.</i>	<i>Rushers.</i>
GRAY, Capt.	KLETZSCH, '84, Capt.
BELL.	MCCOY, '85.
PRICE.	COTIART, '86.
SARGENT.	BUSH, '84.
THOMPSON	TORRANCE, '84.
BECK.	DILWORTH, '85.
HARVEY.	WILLIAMS, '85.
MACK, Half Back.	JONES, '86, Half Back.
THAYER, Half Back.	WURTS, '84, Half Back.
LINDSEY, Quarter Back.	BALDWIN, '85, Quarter Back.
NOBLE, Full Back.	MAURY, '84, Full Back.
<i>Umpire.</i>	<i>Umpire.</i>
T. L. MONTGOMERY.	E. MUNKWITZ.
<i>Referee</i> —D. W. BARRY.	

NEW AND OLD.

What is the glory of the former ages,
Or those to come, contrasted with to-day?
Is it the date of Shakespeare's many pages,
Or is there genius hidden in each lay,
That makes renown for him? Which, living yet,
Shines out so bright, we present worth forget.

Two men once quarreled. They were rather young,
And quickly raised and somewhat sharp of tongue;
But their dispute of such a nature was
That you will smile; they differed just because
One had a coat of relative deceased,
And with this garment he was highly pleased,
For to it wondrous stories were attached,
And he declared its fame could not be matched.

His neighbor had a jacket new and trim,
Whose cut and fit had much delighted him,
And he had seen the other coat and smiled.
His friend at this would not be reconciled,
But tried to prove that *history* surpassed
All recent manufactures. So at last
They did agree to court decision wide,
And by this better judgment to abide.

A wise old man dwelt rather near them, so
Unto his house they did next morning go.
They laid their cause before him; anger led
To bitter words, and thus the first one said:
"I own a garment which I cherish much,
Because it holds some value. It is such
An ancient thing, and is with stories rife,
Left me by one of long extended life."

The other one commenced to argue, too,
And said, "My coat is better; it is new."
Then spoke the sage, "My children cease dispute,
Old things may one and not another suit.
You cannot dress to please the varied mind.
So each, his own taste suited, then may find
Each his own loser; for the wise have told
Some like the new, while some prefer the old."

Learn from this tale that time *gone by* is great,
What is *yet* here its issue we must wait;
And though *to-day* may much of genius show,
"Little is known of what there is to know;"
And that each act of good or ill will make
Links in a chain, which we can *never* break.

And INDICATOR may you now appear,
To public eyes, before this Senior year
Has closed forever—may you welcome find
With college men, and with the college mind.
Though Shakespeare cannot write a life for you,
You may be much esteemed, *if* very new.
May Wisdom bear her brilliant torch before,
To light your pages much, the public more.

SHALL THE REPUTATION OF STEVENS
INCREASE OR DECREASE?

With the greatest sorrow, we notice in the addenda to the last catalogue this statement:
"The entering or freshman class of next year will be limited to fifty students, who will be selected by the faculty after examination, from the entire number of applicants, on the ground of superior fitness and promise of development."

We know not upon which body the responsibility of this rule rests, whether trustees or faculty, or both; and, if allowed to express our own sentiments, we should judge that some have been unduly hasty in the consideration of this most important matter. In such a question as this, which vitally concerns the welfare and reputation of each alumnus, should not their opinions at least have a particle of weight?

There is nothing incompatible whatever in having large numbers, and, at the same time, the very best quality and the highest require-

ments. The fact is, that all the celebrated universities of the world, have the highest requisitions and standards, and are always filled with vast numbers of students of the first quality. Why, then, is it necessary to cripple the growing influence of our Institution, which is clearly manifested by the appearance of large numbers of freshmen? The raising of the requirements was also intended to effect a reduction in numbers, but to the contrary it is always seen to effect an increase. We would by no means advocate a reduction in the required studies, let them be further raised.

But "where are these multitudes of new students which you advise to be put?" some one suggests, "The Institute is now filled to its utmost capacity." Let us see: you say specially, that "the drawing-room facilities are inadequate." There are more than a hundred tables—these, therefore, accommodating a hundred students; and, if each table is then supplied with two boards, as one-half now are, there will result accommodations for two hundred more. Therefore three hundred students can have the usual drawing conveniences which are sufficiently ample for the present, and the needs of the near future. "Where are the recitation rooms for these large classes, as they certainly will have to be divided, and there is not now room?" As we look at things we think there is, but it is occupied for purposes in no way connected with the college good. We refer to the High School, which occupies one entire wing of the building. The managers of this affair have recognized that it would be poor policy to limit their classes to fifty, and to have requirements for admission, and consequently they have reaped a harvest of enormous numbers, which threatens to engulf the whole college. They have turned out our respected janitor from his cosy and comfortable quarters, and now they have encroached to the very heart of the Institute's domains. "Preps" have the right to the occupancy of the lecture rooms of physics, languages, etc., and their childish needs are ministered to by college professors; they have also asserted the right of the entire campus, so that now it is almost impossible for the college students to use it at all.

What is all this leading to? In a few years when the present students return as alumni, they will behold mere children, the "preps" enjoying all the advantages and doing all the honors of the Institution; they will then individually retire to the "Elysian Fields" and straightway commit suicide from shame and

mortification at having entrusted their education to such a degenerate *Alma Mater*.

Surely it is not the duty of a reputable college to furnish preparatory education. If the school desires to continue, there is certainly to be found in Hoboken some other building suitable for the purpose, but whether there is or not, **THE PREPS MUST GO.** We appeal to you, alumni, who above all have the interest and welfare of the college at heart; we appeal to you, students, whom it may not affect now, but it will after graduation, to aid by your influence to see that the *preps are compelled to go*. Seeing that the college receives the same amount from a student as from a prep, and that the former requires less attention than the latter, there is then no reason they should remain and occupy this needed space in exclusion of the college men.

Then again you say, "These larger classes would necessitate more instructors (not necessarily professors), and possibly more room even than the High School could supply. Where then is the money coming from to obtain these?" "Ask and ye shall receive." Once make the need known throughout the country, in the scientific and technical press; beg hard, and something is bound to be received, for there is certainly as much wealth in the engineering profession as in any other of equal size, and there is no reason why Stevens cannot draw it out as well as any other college. During the last summer, the Massachusetts Institute of Technology by this means obtained an endowment for a very large amount. Why Stevens has not received donations before, has been due to the prevailing idea that it was so magnificently endowed as to go on forever constantly living much within its income. Why not also apply to the State Legislature for an appropriation? Other colleges of not half the importance of this have done so, and as a result have secured large amounts.

IMPORTANT ELECTRICAL TESTS AT THE INSTITUTE.

The commission appointed by the Chicago National Exhibition of Railway Appliances, to test the leading systems of electric lighting, have selected the Institute as the site of their experiments with various large dynamos.

The work will commence with the testing of a Weston 24 arc light machine, and a Weston two light incandescent machine. These machines are now at the Institute ready for

running, and the work of arranging the shafting, dynamometers, electric circuits, and electrical measuring apparatus is being rapidly pushed to completion.

Additional floor space has been secured in the shop gallery by flooring over a portion of the open centre space of the gallery floor so that a total area of nearly 1,000 square feet is devoted to the dynamos, their mountings and connections.

Each dynamo is to be run in turn by a vertical belt directly off the flywheel of the shop's engine, and the power to drive it is to be determined by balancing the dynamo on knife edges so that the effort of the driving belt will tend to deflect the machine from a vertical position; but a scale beam attached to the dynamo will be weighted so as to resist such deflection; and, from the weights added to this scale beam, the power to drive the dynamo will be determined. This method of measuring the power which has been lately given prominence by publications of Prof. Brackett, of Princeton, in the English *Electrician*, eliminates all friction outside of the machine except that due to the knife edges upon which the machine is hung, and this will be so small an amount as to be a neglectable error. The electrical energy delivered by the machine will be measured both by galvanometers and a voltmeter, one method checking the other. A special tangent galvanometer has been designed by Dr. Thomas, of the University of Missouri. Several other important instruments have been supplied by Dr. W. E. Geyer, and Prof. Brackett, of Princeton, and elaborate arrangements are made in the way of resistance coils, switches, etc. The experiments will commence in a few days and will continue some weeks. The commission consists of

DR. HENRY MORTON, Chairman, of
Stevens Institute.

MR. COLEMAN SELLERS, Philadelphia.

PROF. BRACKETT, of Princeton.

PROF. THOMAS, of University of Missouri.

PROF. DENTON, of Stevens Institute.

While two of the freshmen were watching the operation of the large Weston dynamo in the gallery of the workshop, one was heard to remark: "You had better button up your overcoat if you don't want your watch magnetized."

INDICATOR CARDS.

As a result of a preliminary examination of the Institute Library, it was found that the material was good, but rather too light to stand the strain that would come upon it should it be run to its full capacity. Its standing parts are well arranged, but its setting, or surroundings, are notably bad. It is placed in a part of the building where it can never be accessible for general use, and its movable parts are consequently always to be found in different professors' rooms, where the students cannot get them.

In "indicating" the library, it was found to give a very poor card, due almost entirely to its poor management, bad setting, and non-regulation. It seems to "cut-off" before the beginning of the stroke, indeed, if it ever makes a stroke.

The back pressure in the form of a noisy location, want of a catalogue, and the number of books indefinitely in professorial hands, is very nearly equal to the effective pressure, thereby reducing the efficiency to a minimum. As it is impossible to make such a machine as a college library automatic, it should have good care and attendance. The engineer should be on hand at all times, and should be alive to his duties. Until this year there has always been a regular engineer, but, according to the 1883-1884 catalogue, we now have none. The Faculty should remedy this oversight, and let us have here an efficient department, which could be made of value to all others. It is feared the College Library will not bear comparison in any respect to the well managed private collections of any of the professors.

"Can such things be,
And overcome us like a summer cloud,
Without our special wonder?"

MACBETH.

Note: We did not try a dynamometer on the library, fearing the embarrassment of a negative result.

The fact of Prof. Carr's sitting in the room during Prof. Wood's examination of the Senior Class last term has been much talked of. That the Seniors regard it as a most uncomplimentary action on Prof. Wood's part, evincing an attitude not in accordance with his usual and past treatment of the class, is certain, and the very fact of his being Prof. Wood made it much more noticeable and insinuating. If Prof. Carr was there for his own good, we have no objections; but this is not at all likely. Again, it is just as unlikely that Prof. Wood considered

himself unable to examine the class alone, for Prof. Carr took no part in the examination. It would appear, then, that Prof. Wood feared the class would use unfair means, and endeavor to cheat, and thought it necessary to have a spy on hand to detect any attempt to "crib." This might do for Freshmen or "Preps," but, when one becomes a Senior, he is expected to have some respect for his professor, for himself, and for his class. He realizes that his time is short, and tries to learn what he can, not to see what he can pass by unlearned. On the other hand, taking the view that the Senior is but an experienced deceiver and well practiced cheat, up to all conceivable tricks for "skinning," it would be indeed strange if he could not "pony" through it all, without Prof. Wood, or Prof. Carr, or any other professor seeing him. In order to make perfect this system of preventing unfair help on examinations, there would have to be a deputy professor for each student, who shall keep close guard upon him, and watch his every movement as a cat does a mouse. If this be so, why not try another plan, one which is at least practical, and one which is honorable and more in standing with a Senior Class: that is, rely on their manliness.

PERSONALS.

We have endeavored in this issue to record all changes in the movements of the Alumni which have occurred since the publication of the last Institute catalogue. Alumni and all former Stevens men are requested to cooperate with the editors in making these columns as interesting as possible, by promptly reporting any changes that may from time to time occur.

'73.

J. A. HENDERSON, assistant engineer, U. S. N., is at present on duty on the *Miantonomoh*.

'75.

F. M. LEAVITT, since Dec. 1st, is assistant superintendent for E. W. Bliss, manufacturer of presses and dies, Brooklyn.

'76.

G. C. HENNING can now be addressed: care of Maurice & Kellogg, bridge builders, Athens, Pa.

WILLIAM KENT, who was associated with W. F. Zimmerman, '76, in the Pittsburg Testing Laboratory in 1883, is now superintendent of the sales department of the Babcock & Wilcox Company, 30 Cortlandt Street, New York.

A. W. STAHL, assistant engineer, U. S. N., was assigned in August to duty at the Purdue University, Lafayette, Ind., as professor of mechanical engineering.

'77.

L. H. NASH is the patentee of a very neat little gas-pumping engine, which is manufactured by the National Meter Company, Brooklyn.

E. A. UEHLING is chemist to the Bethlehem Iron Co., South Bethlehem, Pa.

FRANKLIN VAN WINKLE resigned his position at the Texas State College in June, and coming north, opened an office as consulting engineer at 20 Cortlandt Street, New York.

'78.

W. R. BAIRD'S "American College Fraternities" has recently seen its second revised edition. The work is the only one upon the subject which has any claims for accuracy and authenticity, and has had a large sale. It is published by the author, Box 1848, New York.

H. J. BONN will be connected during the present year with the construction of the Elevated Railroad on Ferry Street, Hoboken, which will haul the street cars from the ferries to the Heights by cable traction.

H. T. BRUECK is with W. H. Bowers, consulting mining and civil engineer, Mills Building, New York.

A. DE BONNEVILLE is draughting at the Delamater Iron Works, New York.

J. W. LITTELL, second lieutenant, U. S. N., is stationed at Fort Wayne, Mich.

'79.

W. P. JACOBS is of the firm of Jones & Jacobs, consulting engineers, Salt Lake City, Utah.

* THE *

Stevens Indicator

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* Stevens Institute of Technology. *

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BY THE STUDENTS OF

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Editors.

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BUSINESS EDITOR, A. P. KLETZSCH, '84.
EXCHANGE EDITOR, JOHN M. RUSBY, '85.

Local Editors.

ROLLIN NORRIS, '85.
E. P. MOWTON, '86. C. R. COLLINS, '86.
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Professors, alumni, undergraduates, and friends, are invited to contribute literary articles, items, verses, discussions of current topics, and personal notes.

It is particularly desired that Alumni furnish us with all items of interest concerning themselves and every one who has been connected with the Institute.

It is expected that all articles shall be written in a courteous tone.

The writer's full name, as well as his NOM DE PLUME, must accompany the article, as assurance of good faith and reliability; but it will not be published, unless desired.

The editors do not necessarily endorse sentiments expressed except in the editorial and exchange columns.

Publishers are invited to send us books and magazines for notice or review.

Exchanges, contributions, subscriptions, advertisements, and all other communications by mail, should be addressed to THE STEVENS INDICATOR, Stevens Institute, Hoboken, N. J.

All persons wishing to secure the business patronage of students and alumni, will find it to their advantage to send for our advertising rates.

THE STEVENS INDICATOR is no longer a thing of the future, but is now actually in existence. Its initial number has been out for several weeks, and criticisms upon it have been pouring in upon us during that time. Naturally, these were of a varied character, some pleasing us, while others were well designed to produce a contrary feeling; some commenting on the contents of our paper, while others took the *price* as a basis for their criticisms, and all tending to make us feel that an editor's life is not a happy one. These comments originated in the minds of professors, students and outsiders; but as yet we have received none from that other most important source, the college press.

The support given us has been about as we expected, little and hesitating at first, but ever on the increase; and we take this opportunity to thank those contributors and subscribers who have seen fit to favor us. Our contributors are few as yet, and we would urge on the students the necessity of lending their every aid to the promotion of such an enterprise as this, for it is only with such aid that it can exist at all, and we think none will question the advisability of such an existence. We would appeal more particularly to those who have some connection with the college interests, such as the captains, officers, and committees appointed by the athletic association, to jot down their proceedings in suitable form for publication and forward them to us. Such news as this is of the most importance in any college paper, and we would keep our columns well filled with it. Our subscribers are fully as numerous as could be expected so early in our existence, yet we hope to double, and even treble, the present list in a very short time, and would kindly solicit subscriptions from all who are in any way interested in our welfare.

IN the first number of our journal, nothing was said concerning its name and how it came by it. We simply offered a monthly college paper to our readers, and let them understand that we intended to call it THE STEVENS INDICATOR. Now, it may please some to know why it is so called and what is meant by the name. At a meeting of the college, which was held to discuss the advisability of publishing a paper, several names were proposed and voted on. This resulted in the adoption of our present title, as being very suitable to the character of the intended paper and to the Institute itself.

We all know what a steam engine indicator is, and that it records on a diagram, which we are able to translate, what actions take place within a steam cylinder during a revolution of the engine. So, also, does our INDICATOR record in such form as to be readable whatever of interest occurs at the Institute and among its friends during the scholastic year. Following up the duty of an indicator, it also attempts to show the engineers what pressure is being carried and where it is cut off, suggesting at the same time, to those competent to read our "Indicator Cards," where it *should* be cut off. In our last issue the "Stuffing Box" was empty, but is well packed this time, and as a natural consequence, we expect to have a smoother run. Our "Chippings" are of a rather inferior quality as yet, since our work has been of the rougher sort; but in the looked for advance, we hope to have work on finer metals, and then our pile of "Chippings" will be of more value.

IT has been suggested, as a last resort, that in the event of not having sufficient matter to fill the columns of the INDICATOR, the vacant spaces could be filled by such odds and ends as "Wants," "Lost and Found," etc. It would rather seem that these odds and ends are of some importance to us, hereabouts, for we have suffered a great loss, and a longing has arisen for the lost article, but which, we

are sorry to say, has not been and does not seem likely to be found.

Now that we have a means of communicating with those beyond our walls, as well as those interested within, it might be conducive of some good results if we made a note in each issue of our paper, in bold type, that **we have lost our gymnasium**, and that we want another if the old one cannot be found.

We are poor, and cannot offer any inducement in the way of a reward for the finder, but we can show that we appreciate any effort for a revival of the gymnasium by putting it to good use in the development of physical strength, by which we may be better able to meet the demands of the lecture room.

The second term of the college year is conceded to be the hardest term of the year, and partly or wholly for the reason that the whole time is given up to study, and only in exceptional cases is there any active physical exercise indulged in.

For those of the students who are blessed with strong constitutions, this extra strain is soon remedied when spring weather permits of out-door exercise; but there are many to whom this constant tax on their minds is positively hurtful, and its effects can be easily traced through their subsequent lives.

The standard of the Institute is constantly being raised, and the work increased, by the addition of new professorships, as though the boys who come to Stevens were of a peculiar order of beings especially designed to have their heads filled and crammed, crammed and filled for four years, and when turned out are expected to assume the duties of an expert M. E.

When one's lot falls in green fields, otherwise a luxurious New York office, the strain is not so great; but when called to new countries and to hard work, which is inseparably connected with such a position, the lack of physical ability often hinders a great mind from following its natural inclination.

The Institute has been aptly likened to a "great rock breaker," whose purpose is to

"craunch and sift" those who enter its doors. True ; but this machine, like all other machines, has its defects, and much valuable ore is lost by slipping through with the waste.

Some few of the students who have the means, use a gymnasium in the town, but only a few ; whereas, if we had a building which could be called our own, it would attract all, giving equal opportunity to every one.

We have our fall and spring out-door sports, we know, but for the winter, no means whatever of attending to this important necessity of physical culture.

In the meetings of the Athletic Association, a committee is always appointed to look into the matter of a gymnasium with a regularity that would lead an outsider to suppose the proceeding was a part of the by-laws of the Association, but nothing has thus far been accomplished.

We would respectfully ask the Trustees to consider this subject, not doubting but that they will appreciate the necessity and advisability of erecting a gymnasium, and thus adding to the already numerous advantages of Stevens Institute.

FOOTBALL is now more than a science. It is an industry, and the man who would excel in it must not only be thoroughly up in everything pertaining to its theory, but must go through a course of the most vigorous training. A model football captain must be one who unites in his make-up the elasticity of india-rubber with the toughness of the boarding house steak and the wearing qualities of the Freshman's freshness. He should be inured to hardship from his earliest infancy. A fall from the roof of a six-story building, supplemented by exercise with glass dumb-bells stuffed with dynamite, should be the morning course. In the afternoon he should take a nap in a blast furnace and "tackle" the fly-wheel of a Corliss engine, or, if possible, a runaway express train. When, by conscientious practice, he has reduced these minor details to the finest obtainable point, he is ready

learn "rushing." After he has attained the highest speed and the greatest perfection in dodging, it will be necessary to "get through" any obstruction in his way. Stone walls will do to begin on, and by the time he can get through one of Prof. Thurston's examinations his training is about 100.

While we have no authority for stating with that degree of positiveness usually characterizing editorial utterances, that Stevens' recently elected football captain has pursued this course of training, we have no hesitation in affirming (so help us, Bobby) that he has attained this result—at least as far as can be judged from his action in the football field. He is not large, but his energy, quickness, toughness, and always-on-the-ballness, fully makes up for his mere want of avoirdupois and cubic feet. Seriously, Oscar Baldwin has a happy faculty of always "getting there." He knows all the points and tricks of the game, knows the men and how to pick them, and—in short, he has the qualifications of a good CAPTAIN. Let the men go through a modified edition of the training suggested above and furnish the captain with the proper raw material, and he will get up a team that will enable Stevens to "keep her end up" in the football field.

THE Inter-Collegiate Base-Ball Association has now an established existence.

The delegates from Lafayette, Rutgers and Stevens held a meeting Feb. 9 at the Sturtevant House, New York City. The University of Pennsylvania decided not to enter the league, on account of some uncertainty as to their athletic grounds.

The three first named colleges, however, completed all the necessary arrangements, adopted a constitution and by-laws as found elsewhere in our columns, elected officers for the ensuing year and arranged a schedule of games.

The constitution is that which was submitted to the convention at their former meeting, Jan. 19, at Easton, and which was then agreed upon, subject to the meeting of Feb. 9.

A number of changes were made, but mostly relating to unimportant minutiae, that relating to the eligibility of players being probably the most important.

A unanimous invitation to join the league was sent to the University of Pennsylvania.

We are very glad that this union has been cemented, and would urge upon our players the necessity of constant practice and severe training. A game won or lost will now be more than simply a won or lost game—it will materially affect the question of who is to be first in the league and who is to be last. Of course all three colleges aspire to the former position, but one of them is sure to have the latter. Let one consideration pull us and the other push us forward to such an extent that we surprise even ourselves by our fine playing. Let us try to win *every* game and then we will be sure of the championship.

We call upon the base-ball men to see whether they cannot eclipse the fame of our foot-ball men, and we would like to see a spirit of generous rivalry between the two teams, each striving to add the greater glory to Stevens.

AMONG the many excellent things the Athletic Association has done this fall, may be counted the appointment of a committee to prepare for the proposed spring games. The appointment of the committee is a large step in the right direction, for it shows a desire on the part of the majority to push the project.

There is no reason why the meeting should not be a success. We have our own grounds, and a large number of our students reside in Hoboken at no great distance from them. It is from these students that we expect the most, more especially as a number of them have made arrangements to attend a gymnasium while the snow is on the ground. The events as arranged are :

100 yards dash.
220 yards dash.
1 mile run.
Running high jump.

Running broad jump.
Putting the shot.
Throwing the hammer.
Throwing the base-ball.
Kicking the foot-ball.
3-legged race.
Pole vaulting.

And tugs of war by representative teams from each class.

It is to be hoped that every one will try and do what he can to make the thing a success. Some one will be selected, by superior fitness, to represent Stevens in the inter-collegiate games, and it is from our own meeting that we expect the best men to come forward. If we have no representatives in the next inter-collegiate contest, we lose our place, which we must not do. So, everybody practice something, and be prepared to make a good showing in that something for the benefit of Stevens.

A LIFE IN THE WEST.

O, a life in the West is the life for me !
Where the wild deer roam 'neath the forest tree ;
Where no "tender-foot" comes with his Eastern ways,
Nor the meek-eyed dude with his cane and stays ;
Where the coyote's howl and the burro's song
Make merry the hours as they speed along.

I love to camp on the mountain's peak
When the summer's sky has sprung a leak ;
When the lightning's flash and the thunder's crack,
And the rain pours gently down my back ;
When the fire won't burn—then I howl with glee—
O, a life in the West is the life for me.

I love to eat my rations of fat,
Of bacon, pork, and such as that ;
Of coffee, made of the innocent bean—
You bet, there's nothing about that's mean ;
With the greasy cards and pipe alight
To while away the hours at night.

I love to pack my baggage and grub
And whack my burro with a club ;
Then gracefully down the mountain side,
With many a tumble, and many a slide,
And hie away in the morning damp
To the latest strike in some mining camp.

I envy not the lot of those
Who live in the East and wear store clothes ;
Who sleep in a bed and eat with a fork
And are mighty particular how they talk ;
Who frequent the club and the matinee—
Just give me the West, the West for me.

SWIFT.

PROGRESS OF ELECTRICAL TESTS AT THE INSTITUTE.

The work of the electric commission, noticed in our last issue, is fast approaching completion as regards perfecting the several methods to be used in determining the efficiency of the dynamos.

The aim is to settle upon a basis for the determination of electromotive force and current measurement which can be accurately applied at any future time, so that, should other makers of machines challenge the results and desire to submit to a comparative test, an unquestionable basis for such comparison may remain at the Institute and be maintained as a standard. Present indications are that the calorimeter method for strength of current, and the absolute electrometer applied through close cells for electromotive force, will be chosen as the desired bases. The large calorimeter designed by Prof. Thomas promises well, and the self-recording dynamometer applied to the belt driving the dynamos is proving very convenient. The latter agrees with the Brackett dynamometer to within one-tenth of a horse power.

THE NEW PROFESSOR OF MECHANICAL ENGINEERING AT SHEFFIELD SCIENTIFIC SCHOOL.

It is announced that Mr. C. B. Richards, superintendent of the Southwark Foundry and Machine Company, Philadelphia, and former Mechanical Engineer at Colt's Armory, Hartford, is to fill the vacancy caused by Prof. Dubois' transfer from the chair of Dynamical to that of Civil Engineering at Sheffield Scientific School, Yale College.

In securing the services of one of Mr. Richards' large and rare experience as a practical engineer, Sheffield is to be highly congratulated. It is to be hoped that the practical ingenuity and skill in devising experimental apparatus, which has marked Mr. Richards' commercial career, as exemplified in the Richards' Steam Engine Indicator, the Automatic Testing Machine, and various dynamometric apparatus at Colt's armory, and the several ingenious appliances used in the ventilation of the Hartford State House, may now have their application in scientific investigation, while it cannot be doubted that Mr. Richards' great knowledge of applied mechanics will render his services as an instructor of the choicest value to the student.

INSPECTION TOUR OF CLASS OF '84.

It is proposed that the visits of the class commence with a trip to Bethlehem on the first Saturday in March, and that they visit Trenton and the machine shops at Philadelphia and Edgemoor the following Wednesday and Thursday. It is expected that Mr. Carr will then join the class in a trip to the ship yards of Philadelphia, Chester, and Wilmington for Friday and Saturday of the same week, so that the entire western tour will be accomplished before the April vacation, when it is intended to make the New England trip. It is desirable that the names of all who contemplate making the several visits be deposited with Mr. Riesenberger within this week, in order that the necessary preliminaries regarding transportation rates can be effected.

J. E. D.

A QUESTION.

Dare I trust a boyish fancy,
Born within this swelling breast,
Seeking one way, then another,
Where, O where can it find rest?

Though I seek and seek it madly,
Yet it nowhere can I find,
Till it seems that I would almost
In despairing lose my mind.

Yet I pray the Lord that never
Such my dreadful fate will be,
While upon this earth I linger,
Waiting, it may be, for—she.

She, who to my boyish fancy
I would picture all could fill,
If I only could persuade her
To pronounce the words, "I will."

But how is it, older people,
You who have a long time been
In the holy bond united,
Tell me is this wish a sin?

Is it sinful, older people,
When you have a loving heart,
And a gentle creature won it,
From this creature ne'er to part?

If it's sinful, older people,
Then, pray tell me, why did you,
In your youth, to one another,
Pledge and plight yourselves so true?

If you dare not say it's sinful,
One more question I would ask,
For the same thing that you practiced—
Why do you take us to task?

And doubt that this our "fancy"
Can with all your "proved love" scope;
"We are young," we must remember,
But why crush such blissful hope?

THROUGH THE BLAST FURNACE.

One of the '87 men was directed to clean the blast furnace out, and after using the crow bar until his arms felt like elongated boils, concluded that there was a more easy way to do the job. With a pleasant expression on his face, showing that he considered himself one of the foremost inventors of the age, he drew himself under the furnace and crawled up inside. For a while the sound of the blows of a hammer came merrily out on the gassy air. But suddenly an agonized cry broke forth, and then the muffled words, "Moses! help me; I am stuck!" His companions drew him out, after the manner of the pulling of a tooth. His face was bleeding, his hair and clothes were filled with cinders, and yet his heroic spirit was far from being quenched, and the first words that were spoken by this "cinder eater" were, "I am the first man through the furnace; follow who that dare."

THE SMOKING ROOM.

We are highly delighted with the interest and kindness which the Faculty have displayed toward the two lower classes, in providing a lunch and smoking room for their special benefit. It is true that the two rooms are combined in one, but that does not matter; in fact, it only adds to the peculiar odor which fills even the overcoat pockets of the happy (?) student who does not smoke, but who, however, would like to choose his own tobacco if he must be compelled to smell the smoke.

If one is not ravenously hungry, he can content himself with the dense and stomach satisfying smell of bread and butter which has constantly filled the above mentioned room since the coming of '87; not that we have any fault to find with the "staff of life" and its usual companion, but we would prefer it in its accustomed place, and not in what was meant to be a coat room—beg pardon, I meant exchange. It seems strange to us that young men who have, no doubt, been brought up better, should be content to sit in a room not fifteen feet square and about seven feet high, and convert themselves into active volcanoes, until, even in the small space allotted to us, there is need of a guide to find one's coat through the dense smoke from bad cigarettes. We hope that the objects of this notice will be kind enough to discontinue their fumigating

operations, or at least change their base of operations and have some consideration for the feelings of their unfortunate (?) college mates who have yet to learn how to smoke.

NON-SMOKER.

A COAT EXCHANGE.

One day last month an amusing coat exchange took place in the Freshman class.

One of the workers in the moulding room drew off his overalls, laved the smut off his face and prepared himself to regain his proper place in society. He was about to put on his coat when he found that it was gone. A careful search did not reveal it. A coat was hanging in the place where he had left his own. Hurriedly he seized upon this, and noted with joy that it was but about six inches too short and only a foot too large around the body. As he was on his way for a train and late, he hastened his steps through the hall, and just as he was about to leave the Institute, a fellow student passing him ejaculated, "Jimminy, somebody has my coat!" and the moment afterward rushed at the victim of his carelessness, and demanded why he had stolen his coat. At the word "stolen" the blood rushed into the face of the first man, and, waiting for nothing, he closed with the other.

At this moment, when the life of each seemed as if suspended by a single thread, a professor was seen approaching and the conflict was abruptly ended. Sullenly the combatants exchanged coats and separated. One to discover that he had missed his train and would therefore lose his dinner; the other, that the car which was to convey him to a fair damsel's door, whom he had promised to take to a concert, had gone, and that it was too late to start to walk the distance to her door.

"Who stole who's coat?" is still a question in the Freshman class, and it is feared that it will never be settled.

MORTAR BOARDS.

A few upper classmen have been trying to introduce the custom of wearing mortar boards around college.

No one is to be condemned for introducing a new custom, for we always like to see something new tried and to have the college judge as to its merits and advisability of adoption.

This present experiment, however, we cannot uphold, as in order to wear mortar boards, gowns also must be worn, and this is not consistent with a scientific course, especially since we graduate with a degree of Mechanical Engineer.

Although the custom in itself is entirely inappropriate, there is a great objection to the introduction of such a conspicuous dress in a college situated in a city and not having any dormitories.

They have tried to introduce the wearing of mortar boards and gowns at Columbia School of Arts, but, have not fully succeeded, for the same reason that they have no dormitories.

The red hats in vogue last spring are better than these, or if the students want something new, why not wear some sort of an ingenious cap, something like the handsome skull caps worn at the Columbia School of Mines?

MARK TWAIN INSTEAD OF FOWLER'S ENGLISH AS A TEXT BOOK.

To illustrate how hard the Freshman class has been studying during the recent term, the following incident is noticed: One of the members of the above class, after a night spent in study and rest in unequal proportion, hurried down at 10:30 to his breakfast, then rushing to his room, seized the book which he had been cramming the night before, pulled on his overcoat, and started for the Institute on a hundred-to-the-minute walk.

A studious individual, without a text-book, saw him enter the building, and laying hold of this opportunity which Providence had thrown in his way, asked to be allowed to take a last look at the book, before his fate—in shape of Prof. Wall—was to be met. The book was handed to him, when to his astonishment he discovered that the book in question was Mark Twain's "Tramp Abroad."

Comment is unnecessary. To our mind surely this has a strange look. Whether some evil spirit or spirits exchanged Fowler for Mark, or whether Mark was crammed instead of Fowler, we cannot say.

We should advise, however, that if any student has a copy of Mark, he put it in a safe place, for Mark will out.

Professor (who has been trying to deduce a very simple equation, but with indifferent success)—"Oh! here's *our* mistake."

THE AMATEUR FARMER.

I dream't of a beautiful time,
When the world shall happy be;
When elephants and hyenas
Shall blossom on every tree:
When tamarinds and potatoes
Shall cease their dreadful roar;
When turnip trees shall blossom
In the garden evermore.

I dream't of a great Republic,
When people shall all go West,
Sow plums and reap tomatoes
In the land they love the best;
Where pig iron and molasses
Shall bloom on every hill,
And chickens low in the barnyard
While gooseberries toil at the mill.

I'm weary of seeing the cabbage
Handle the rake and hoe;
I'm weary of watching and waiting
For the grasshopper bush to grow;
I long for the time when spinach
Shall cope with bread and milk;
When hens shall lay potatoes
And horses spin raw silk.

Oh! sweet were the vanquished hours
When I wandered down the glen,
And wreathed my brow with tomatoes,
Or plucked the ripened hen;
When the donkey twined up the trellis,
And the cucumber chirped in the grass!
And the sweet potato whistled
To its mate in the mountain pass.

But gone are the days of childhood,
And manhood's dreams are mine;
Yet I long for the by-gone hours
As I sit 'neath this Turkish vine.
Oh! wreathe your blossoms about me,
And soothe my aching breast;
While gooseberry plaintively warbles
And lulls me into rest.

LACROSSE.

For some time past there has been some scattering talk about inaugurating the game of lacrosse at Stevens. The matter has heretofore gone no further than talk, there being apparently no one taking sufficient interest to push the thing through.

At last, however, it appears that we are to number this most excellent game as one of our athletic diversions.

We will not here attempt a full description of the game, but will simply give a brief outline:

Lacrosse occupies a position intermediate between football and "hockey," or "shinney," yet differs widely from both. The object of the players is to get the ball (which is of solid

rubber and about the size of a tennis ball) between goal posts, of which there are two, six feet high and six feet apart, at each end of the field. Twelve players are required on each side, and they play in pairs. This last is one of the pleasant features of the game; the men have certain assigned positions in the field, and when the ball is in another part of the field, a player always has an opponent, also disengaged, with whom he can chat.

The "sticks" with which the ball is handled are about five feet long, bent over at one end and netted about half way up. The ball cannot be touched with the hands, but must be managed entirely with these netted sticks. Kicking the ball and striking it on the ground, as in "shinney," are, in most cases, bad playing. Expert playing requires speed and agility, the ability to dodge while carrying the ball on the stick, and also to catch and throw with accuracy.

Lacrosse possesses all the advantages of football without its principal drawbacks. It is splendid as a physical developer, but is not the rough-and-tumble game that foot-ball is. Dexterity and quickness tell more than sheer weight.

The rules are simple and easily learned. There are no "off side" complications, everything being fair, except intentionally striking the person of another player. There are no time consuming and uninteresting "downs" to be played, but the game is essentially one in accord with the spirit of the age. The pace is a rattling one from beginning to end.

If we enter into the matter earnestly, there is no reason why the Stevens Lacrosse Team should not win laurels even from such colleges as Harvard, Princeton and Yale.

We extend to those interested in starting this game our best wishes for their and its success, and if they ever feel discouraged, would remind them of the old proverb, "*C'est le premier pas qui coute.*"

OLIVER SNOWDEN.

BASE-BALL.

The brilliant record made by Stevens last season in this scientific sport is so well known that it is not necessary to publish the record here. Suffice it to say that never before since we have had a base-ball nine have we played with such strong teams, scored so many victories, nor the standard of playing been so high. This is partly due to the increased interest taken in base-ball last year, but more especially to the fact that on the team were men who had

played on the nine ever since their Freshman year, and had become expert players; but now that some of these men have graduated, we have only one course to pursue—to work harder than ever before, and keep the place which we now hold, viz.: first among the non "American College Association" clubs. This we are better able to do this year than last, owing to the fact of having a gymnasium—small to be sure, but sufficiently large to prepare for the field practice, which promises to begin earlier than usual this season. Every man in college who has ever played should take it upon himself to use the gymnasium every Tuesday, Friday and Saturday afternoon from now until the first of April, not simply as a pastime, but work hard and systematically, especially in developing the muscles of the arms, shoulders and chest.

Before last year altogether too much indifference had been shown as to securing positions on the nine. This spirit is not yet entirely done away with, but the sooner it is the better it will be. The power to accomplish this lies mainly with the lower classes, for at present there are men in them who would by a little practice make good players, and if they will show more interest there will be a livelier competition, a better team and a more brilliant record; then it will not be left for the captain to drum up the men every time there is to be a practice game.

This season will be a particularly exciting one, owing to our having formed a league with Rutgers and Lafayette. This should be an incentive for hard work.

Yale has eighteen men training for the nine, the idea of the captain being for these to play a series of games among themselves before choosing the regular nine. In this way each position will be filled by the man who has the best record. It would be well for us to follow her example, but it cannot be done unless there are enough trying for the several positions to make up two nines. If the men do not care one way or the other it is impossible for the captain to make them, but if they will make more of an exception of this year than even last, they can rest assured that the best men will get the positions, and that these men will be the means of winning for Stevens the pennant which is offered by the league. And now if all the men who have ever played or who care to try for this season's team will let me know, it will greatly aid in deciding the course of training to be pursued.

C. L. GATELY, *Capt.*

CONSTITUTION,

The Constitution adopted by delegates from Stevens, Lafayette and Rutgers, for a base-ball association, New York, Feb. 9, 1884.

ARTICLE I.

SEC. 1. The name of this association shall be the Inter-Collegiate Base-Ball League.

ARTICLE II.

SEC. 1. The following colleges shall constitute the league: Stevens, Lafayette and Rutgers.

SEC. 2. An annual tax of ten (10) dollars shall be levied upon each college in the league, payable on or before the first day of May, twenty-five (25) dollars of which is to be expended on a pennant for the champion nine, and the surplus to be used in defraying general expenses incurred by the Secretary.

SEC. 3. An equal assessment shall be levied by the Secretary at the end of the season, upon each college in the league, to defray the amount incurred for printing and general expenses.

SEC. 4. No other colleges than those named shall be admitted to membership except by the unanimous consent of the colleges of the league.

SEC. 5. Any college wishing to enter this league subsequent to its organization shall be required to pay an initiation fee of fifteen (15) dollars.

ARTICLE III.

SEC. 1. The officers shall consist of a President, a Vice-President, a Secretary and Treasurer, and a Judiciary Committee of one from each college, the President of the league being ex-officio chairman of the committee, and having a vote only in case of a tie.

SEC. 2. All officers shall be elected by ballot, except the Judiciary Committee.

ARTICLE IV.

SEC. 1. The series of games shall consist of two (2) with each college, the first game only on each home ground, or on grounds mutually agreed upon, counting; and the championship shall be decided by the greatest number of games won. In case of a tie for the championship, one game shall be played by each club thus tying with each of the other tying clubs.

Said games to be played upon grounds mutually agreed upon, and within ten (10) days after the last schedule game.

SEC. 2. The schedule games shall be arranged by the convention at the regular meeting.

ARTICLE V.

SEC. 1. Each club shall receive its entire home gate receipts and pay its own expenses.

ARTICLE VI.

SEC. 1. Any club having agreed to play a championship game with another club on a certain day, and refusing or failing to meet its engagement, shall, unless the failure be caused by an unavoidable accident in traveling, or the game be prevented by rain, or postponed with the consent of the other club in writing, forfeit its membership in the league. A certificate, signed by at least three (3) members of the faculty shall also be considered a sufficient excuse for failure to play a schedule game; said certificate must be forwarded to the other nine within one week after failure to play.

SEC. 2. In case of a postponed game, the visiting team shall furnish three dates, one of which shall be a Saturday falling before commencement of the home nine, which dates must be furnished within two (2) days after the time of the game postponed.

SEC. 3. Tie games shall be considered the same as postponed games, but shall be played on grounds mutually agreed upon.

ARTICLE VII.

SEC. 1. Any student who is regularly a member of any college of the league shall be eligible as a player. Any student who shall play on a professional base-ball nine, or who has ever in any way received pay therefor, shall not be eligible. Questions of eligibility to be investigated and decided by the Judiciary Committee on application of any college.

ARTICLE VIII.

SEC. 1. The home club shall furnish the umpire, who shall not be or not have been a member of either contesting colleges.

ARTICLE IX.

SEC. 1. The annual meeting of the league shall be held at New York City on the second Saturday in February at 10 a. m., each college

to be represented by not more than three (3) delegates. An extra meeting may be called by the delegates at the request of three colleges.

ARTICLE X.

SEC. 1. A two-thirds ($\frac{2}{3}$) vote of the league shall be required to amend this constitution. All votes shall be taken "by colleges."

BY-LAWS.

SEC. 1. It shall be the duty of the Secretary to see to the printing of the Constitution and By-Laws, and the proceedings of the league in convention, together with the individual records of the previous year's players.

SEC. 2. The captain of the winning nine in each game, shall send the score to the Secretary of the league, within one week of the time of playing, under a penalty of a fine of five (5) dollars.

SEC. 3. The Secretary of the league shall send annually to the captain of each club of the league ten (10) blanks on which the score shall be sent as provided for above.

SEC. 4. Immediately on the completion of all games necessary to award the championship, the formal vote of each college, signed by at least one (1) of the delegates to the preceding convention, shall be forwarded to the Secretary of the league for the disposition of the pennant, the money for which shall thereupon be forwarded to the manager of the winning team.

SEC. 5. The games for the championship of this league shall be governed by the "American College Base-Ball Association" rules.

We subjoin a list of the officers of the league elected for the ensuing year:

President—A. C. CAMPBELL, Lafayette.

V. President—J. H. STEWART, Stevens.

Sec'y and Treas.—R. A. LEARNED, Rutgers.

SCHEDULE OF GAMES.

Rutgers vs. Lafayette	at New Brunswick,	May 10th.
Lafayette vs. Stevens	" Easton,	May 17th.
Stevens vs. Rutgers	" Hoboken,	May 21st.
Lafayette vs. Rutgers	" Easton,	May 24th.
Rutgers vs. Stevens	" New Brunswick,	May 30th.
Stevens vs. Lafayette	" Hoboken,	June 3d.

THE FRESHMAN'S SONG.

And now at Stevens I am here,
Exams. are passed, and much I fear,
That in the future there may be
More than enough to banish me.
My rosy morn in lessons long,
My noons in eating and in song.

And now to drawing I must fly
Up stairs and halls quite near the sky;
Lines straight, and curves with shadows dark
And drawing pens that make no mark.
My afternoon with compass fool,
And wishing that I had a stool.

But when in shop I take my stand,
The flying tools on every hand,
The gases foul from foundry,
Are quite enough to sicken me.
My eve with studies, trig. and French,
My night with dreams of compound wrench.

Thus pass the days and nights away.
But plucked I'll be? I cannot say.
A side door—do I enter here—
And of that door I have much fear.
But then, again, I should not quake,
For I'm of the stuff an M. E. to make.

Stuffing Box.

THE chirpings of '84, previous to recitations,
betoken great things for our Glee Club.

The pictures of the foot ball team are fine.

One of our hopefuls, Johnson, '86, has left college.

Mr. Bang is said to be the heaviest man in his class.

A wiser than Solomon has appeared; you can find him in '87.

Plane trigonometry has been added to the entrance examinations.

Mr. Walton appears with a bang; the wonder is where did he get it?

'85 class meetings are unique. No minutes, and but little accomplished.

The Institute is having 80 to 90 volumes of the *Comptes Rendus* bound for the library.

What has become of the committee appointed to preserve the privacy of '85's class room?

At the class meeting of '87, held to discuss the need of a class pin, no definite action was taken.

The library also receives specifications and drawings from the patent office as soon as published.

The classes are to be limited to 50, and not to 40, as erroneously stated in some of the college journals.

The class of '86 enjoys the rather doubtful honor of being the first class on which all new Faculty schemes are sprung.

Mr. McElroy, it is believed, has the finest mustache in the class. The reputation for the faintest belongs to Mr. Bayless.

Considerable talk about holding the next commencement exercises in New York is at present agitating the Senior class.

The banjo fiend is abroad in '87; he goes about seeking whom he may devour, bearing his banjo and the tender name of Hart.

It is somewhat of a pleasure to see our shop resuming its old duties; for there is much work to be accomplished in very little time.

The members of the two upper classes have spent many enjoyable evenings at the receptions tendered them by Prof. and Mrs. A. R. Leeds.

Co-ordinate geometry is much liked, and great admiration is expressed for the ingenuity of Des Cartes, who was one of the originators of the plan.

Ashes on slippery mornings, properly sprinkled about the front steps, would greatly add to the personal comfort and appearance of those entering our halls.

The library is indebted to Prof. Thurston for "Box on Strength of Materials," and "The History of Steam Navigation," by Rear Admiral G. H. Preble.

The Entertainment Committee report progress. They are working hard, and a very complete and interesting programme may be looked forward to.

The hall into which the Hudson Street basement door opens is very dark. Perambulatory exercise might be materially assisted by keeping the gas lighted there.

On Friday evening, Feb. 8, several of the Seniors and Juniors were very agreeably entertained at the residence of Prof. C. W. Mac Cord. The young ladies present added not a little to the pleasure of the party.

The exhaust of the rotary engine used in the gallery of the shop makes such a disturbance that it is with difficulty that the recitations can be heard in Prof. Wall's room. There is room for improvement here!

Bygones should be bygones; but as to next best place in football after Harvard, we must remind our friends at Wesleyan, that Stevens enjoyed that honor last season, but then the place is open for competition next fall.

Change in Editorial Staff.—Messrs. Rice, '85, business editor, and Boynton, 85, exchange editor, resigned, Messrs. Norris and Rusby being elected from '85 to fill the vacancies. The board now has for business editor Klettsch, '85, with Rusby, '85, as exchange editor.

Prof. Leeds objects to having umbrellas brought into class, but if he could explain the chemical laws by which they evaporate to dryness and disappear when left to the care of the coat, umbrella and anything-you-can-lay-your-hands-on exchange, we wouldn't say anything.

It would be a pleasure to see some of the latent literary genius about being developed and mailed to the Board of Editors—contributions solicited—decisions as to merit reserved by the Board. Incipient *litterateurs* out of postage stamps can hand the products of their genius to any of the editors in person.

Prof. Wood actually ventured into his class room while the Sophomores were there. Ears, eyes, mouths, and pencils, attested the interest of the class in this novel innovation, and as he withdrew, each countenance relaxed into an expression of longing and the air seemed to fill spontaneously with requests for more!

There have also been added to the library, three volumes with plates of "Experiments of M. V. Regnault," and three volumes of "Maxwell on Electricity and Magnetism," "Rankine on Ship Building," and D. K. Clark's "Rules, Tables and Data for Mechanical Engineers," were presented to the library by the alumni.

The gymnasium movement has become so much of a necessity, that a number of the students have procured the use of the best one in the town. Three afternoons of each week have been engaged, and from the interest shown much muscle may be expected to accumulate on the bones of our undergraduates.

Somebody sends word that a large Sophomore has invented something. Woe betide the man! He little knoweth what becometh of inventors when the products of their mechanical genius shall be brought to meet the crucial test of the—, but perhaps his great invention is only a new fetch-'em-out to coax into the light of day the embryo hirsute appendage of his upper lip.

CHIPPINGS.

Of all sad words of tongue or pen,
The saddest are these, "I've flunked again."

Ex.

2 lovers sat beneath the shade
And 1 un-2 the other said:
"How 14-8 that you be-9,
Have smiled upon this suit of mine;
If 5 a heart, it palps for you—
Thy voice is music melody—
'Tis 7, 2 be thy loved 1,2—
Say, O nymph, wilt marry me?"
Then lisped she soft, "Why 13-ly."

Ex.

Mary had a little lamp,
'Twas filled with kerosene,
She blew right down the chimney
And vanished from the scene.

Ex.

Latin Professor (to student with a suspicious looking bunch in his cheek)—"*Quid est hoc?*"
Student—"Hoc est quid."—Ex.

College students in Siam are allowed two wives; the Siamese way of hazing, no doubt.
—*De Pauw Monthly*.

There was a man in our town,
And he was wondrous wise,
He wrote a crib upon his cuff,
Of much diminished size.

But when he felt a little bored,
And yawned with arms extended,
This wise man gave himself away,
And straightway was suspended.

Ex.

Professor in German.—"Mr W. how would you decline *guter, alter, rother wein*." Mr. W.—"I shouldn't decline it."—*Orient*.

TO MY LAMP.

Oh Lamp, thou art a goodly friend to me,
I light thee, and 'tis by thy light I see;
I blow thee out, and in return some day,
Perchance thou'lt blow me up by way of pay.

Argonaut.

EXCHANGES.

With the present number of THE INDICATOR begins the real existence of the Exchange Department, one which, although founded as one of the original departments of the paper, has been productive of no matter heretofore. It now, however, enters upon a career which we hope will be active and unbroken, and which we will endeavor to make as interesting and attractive as our ability and the quality and quantity of matter presented will admit.

This time, however, we will have to content ourselves with the simple acknowledgment of a few exchanges who have favored us up to the present time. These are *The De Pauw Monthly*, *The Cornell Review*, *The Oberlin Review*, *The Lafayette College Journal*, and *The Electrician*.

REVIEWS.

SPORT WITH GUN AND ROD IN AMERICAN WOODS AND WATERS. Edited by Prof. Alfred M. Mayer, of Stevens Institute of Technology, Hoboken, N. J. Published by The Century Co., New York.

Prof. Mayer's new book is said to be the finest sporting publication ever issued in this country, and, from a careful inspection of the book itself, we are inclined to think the statement true. It consists of a series of articles by the editor, and such men as John Burroughs, Charles Dudley Warner, etc., which have been illustrated in the highest style of the art by the best artists and engravers of this country, and covers the field indicated by its title with great thoroughness. It includes archaeological, historical, and practical articles on the sporting implements, with practical instructions in taxidermy and essays on sporting subjects, in some of which is a great deal of quiet humor.

The Century Co., who has certainly as great resources as any other house in this country for the publication of such a work, has been lavish with time and money spent upon it, and the result has been a magnificence almost unparalleled in a book of that character. The treatment of the subjects handled by the artists for such a work as this is one of the most difficult problems which arise in the artistic career, and requires a personal acquaintance and long study, if the aim is truthful delineation. In this case the artists have certainly met with success, and more especially is this noticeable, since, in some instances, the writers have illustrated their own papers. As specimens of wood engravings, those contained are equal to the best work in that line, and we repeat again that it is the finest American sporting book we have yet seen.

Our professor in Mechanical Engineering tells us that out of one hundred boiler explosions, *two* are due to the absence of pressure gauges, while *seven* are due to defective gauges? Would it then be safer to go without a gauge.

THE STEVENS INDICATOR.

THE
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SCHOOL OF MECHANICAL ENGINEERING,
FOUNDED BY THE LATE EDWIN A. STEVENS,
—AT—
HOBOKEN, N. J.

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T H E

Stevens Indicator.

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HOBOKEN, N. J., MARCH, 1884.

No. 3.

The Stevens Indicator.

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FIRST OF EACH MONTH, DURING THE COLLEGE YEAR,
BY THE STUDENTS OF

Stevens Institute of Technology.

Editors.

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BUSINESS EDITOR, A. P. KLETZSCH, '84.
EXCHANGE EDITOR, JOHN M. RUSBY, '85.

Local Editors.

ROLLIN NORRIS, '85.
E. P. MOWTON, '86. . . . C. R. COLLINS, '86.
LADD PLUMLEY, '87.

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Subscribers will please immediately notify us of any change in their address or failure to receive the paper regularly.

Professors, alumni, undergraduates, and friends, are invited to contribute literary articles, items, verses, discussions of current topics, and personal notes.

It is particularly desired that Alumni furnish us with all items of interest concerning themselves and every one who has been connected with the Institute.

It is expected that all articles shall be written in a courteous tone.

The writer's full name, as well as his NOM DE PLUME, must accompany the article, as assurance of good faith and reliability; but it will not be published, unless desired.

The editors do not necessarily endorse sentiments expressed except in the editorial and exchange columns.

Publishers are invited to send us books and magazines for notice or review.

Exchanges, contributions, subscriptions, advertisements, and all other communications by mail, should be addressed to THE STEVENS INDICATOR, Stevens Institute, Hoboken, N. J.

All persons wishing to secure the business patronage of students and alumni, will find it to their advantage to send for our advertising rates.

IN regard to the circular which has been sent to all the colleges of the United States, concerning athletics, Stevens has not accepted them, but has tabled them, awaiting an answer from Harvard, in reply to a question which arose at the faculty meeting, held to discuss the circular. Some of the daily papers have erroneously stated that Stevens has accepted the proposed regulations. We desire to inform all concerned to the contrary.

ON Thursday evening, February 21st, the Senior Class were tendered their first reception this year at the house of Prof. Thurston. The students were received by Professor and Mrs. R. H. Thurston, who were kindly assisted by a number of ladies and several seniors. After spending several short but sweet minutes in conversation, the '84 Glee Club sang several of their best pieces in honor of the occasion. About ten o'clock a collation was served to the guests present, who were bounteously supplied by fair hands. The ladies present added no little to the gathering; considerable difficulty, however, was met with by them in managing the bashful Seniors.

Prof. and Mrs. Thurston are to be highly congratulated for bringing about and successfully terminating one of the most delightful gatherings which the present Seniors have as yet engaged in. After sufficiently recovering, the glee club gave several more of their selections, and all dispersed with many wishes and thanks to the originators of the pleasant affair.

NO the practice, to which some of the students are addicted, of using the floors of the recitation rooms as spittoons, we would offer an emphatic protest. To a person of any delicacy, scarcely any habit is more dis-

gusting, and to be compelled, as some of us sometimes are, to occupy a seat, the previous occupant of which has been emptying his mouth, and, from appearances, blowing his nose on the floor, is by no means conducive to one's peace of mind. This species of ornamentation, though practiced to some extent in bar-rooms and other places frequented by uncultivated persons, is not yet a recognized branch of art, and until it is, we would request those who are devoting themselves to it to suspend their operations in this line. The two spittoons in the library are godsend, but we would suggest to the Faculty the impracticability of going from the top story to the ground floor every time we are obliged to expectorate; could we not have one in each class room?

ON the twenty-sixth of February, in response to a notice posted on the bulletin-board, some twenty students assembled in Prof. Thurston's lecture room to organize a Lacrosse Club. Norris, '85, was elected Chairman, and Coffee, '85, Secretary. A number of encouraging letters from prominent lacrosse men were read, in one of which Mr. J. R. Flannery, Secretary of the National Lacrosse Association, offered to come over to Hoboken any Saturday afternoon and give the Stevens men some lessons. This kind offer was accepted, and the Chairman is to post a notice when he may be expected. It was decided not to adopt any Constitution or By-laws at present, but for a name, "The Stevens Lacrosse Association" was fixed upon.

At the close of the meeting, fifteen or more of the students handed in their names to the Chairman for sticks.

We are especially glad to see that the football men are going into lacrosse, for it will be excellent training for them.

Student (*trying to make an apt quotation*):
 "That kills two flies with one stone."

FOR the March number of the INDICATOR we take great pleasure in presenting to our readers a sixteen-paged paper, independent of the advertising pages and cover. It will be remembered by those interested in our welfare, that our initial number was very uninteresting, containing only foot-ball matter, with little else.

This was due to three reasons: first, that our time was so occupied in starting the paper and getting it in running order, that little was left to devote to writing; second, that the foot-ball matter and records of games would be interesting and valuable to refer to later, while they would not be acceptable reading in another issue; and third, that we had considerable trouble in organizing our board of editors, the two from the class of '85 having resigned, thus leaving their work on the shoulders of the others.

With our second copy, however, there came an improvement—at least we think so, and have been led to believe it from the remarks of others; but that made us fear the more for the success of what was to follow, for a decrease in any way is most disastrous; yet we cannot always increase, or even remain at the height of whatever success we may reach.

With our third issue, however, the one which we are now pleased to bring out, there still comes an improvement, and with the aid of students, alumni and friends, we will endeavor not to fall back. Our advertisers are increasing in number, and subscriptions are slowly coming in. We hope to see these latter "brace up." Most of the college papers are acknowledging us in their exchange columns, criticising us both favorably and otherwise.

THE proposed regulations for Intercollegiate Athletic Sports are something which have long been needed. We do not say that these are the precise rules that we have been waiting for, but the spirit is there. It is unfortunate for some of the smaller institutions of learning that they have no gymnasiums in which to keep up their physical

health during the season in which it is impossible to practice out of doors ; to these the proposed rules will be a benefit, as it will increase their shares in a match game of any kind with their larger and more fortunate sister colleges, who have at present not only good gymnasiums, but professional trainers to care for their physical needs. It is rather too much to expect a team selected from two hundred students, and not having the benefits of professional training, to compete, with any chance of success, with a team selected from fourteen hundred, and with every possible advantage.

Of course we do not expect these large and wealthy colleges to give up their many advantages and come down to our unfortunate condition; but we think that some sort of equality should exist between any two competing teams, and that the college athletics should be included in the college work as part and parcel of the course ; not making, as seems to be the case in some institutions, an almost separate department of athletics, which is sheltered under the college name, but in reality being an almost complete department in itself, which is a refuge for physically strong students, who manage, by a great deal of hard work, to remain in one class for some time, paying, however, a large amount of time to athletics, to such good effect that it is good for the reputation of the college team to retain them as long as possible. The fifth resolution of the proposed rules provides for this; and this rule, we think, ought to be embodied in any set of rules which the college may hereafter adopt.

Rule 1 will, no doubt, have a very good effect on the athletically inclined student, who uses the fact of his being on one of the teams to do a large amount of unnecessary cutting, thereby getting the team somewhat into disgrace.

Rule 2 is the rule which is most needed in our colleges.

The association of professionals with our games is very much to be regretted, bringing, as it does, a most undesirable factor into what was originally meant to be friendly com-

petition. The foremost idea in a professional's mind is anything but friendliness toward his competitors, and he is very apt to inculcate a like idea into the minds of those under his charge.

Rule 3 will ever be a disputed point, which we would like to see settled once for all, and a *binding* definition given to the word *amateur*.

Rule 6 is rather too binding, as it compels the teams to play on poor grounds, when good ones are near at hand, and can be had at a small expense when gate-money is to be had, although the money question is one which requires very delicate handling. As we have no boats, Rule 7 does not affect us at all.

In regard to the eighth, it would be necessary to have a sufficient number of colleges in the proposed league, for a league it will be, to insure a goodly number of games.

ONE of the first things which will be looked for in this number of the INDICATOR will undoubtedly be an editorial on what shall we call it, physical culture? Perhaps that is a rather high-sounding name, but it is the origin of our remarks, and a subject which is now agitating the students of the Institute and being agitated by them.

Every one who has paid any attention to his or her physical education will have heard of Mr. Wm. Blaikie, the author of "How to get Strong,"—that very excellent book that should be found in every household ; and will probably know that he is a prominent New York lawyer, up to his eyes, as he says, in his business, while lending considerable time and energy to the promotion of that most important but much neglected branch of American education, physical culture.

He is personally known by several of the students of the Institute, and through them, those who are interested in athletics, were enabled to secure his valuable services for a few hours Friday afternoon, February 29th. Prof. Wall's lecture room was obtained, and all students were excused from work so as to be able to attend the lecture. About a hundred

and twenty-five were present, including several professors, and these enjoyed a very pleasing and instructive discourse on physical culture. Mr. Blaikie is a graduate of Harvard College, having while there taken an active part in all athletics, and especially in rowing.

Since then he has followed up and pushed ahead the subject of athletic exercise, and is consequently a very able person to lecture to a body of students.

In his little talk to us, he began by dividing education into three parts—mental, religious and physical. Taking the first of these, he gave a very interesting account of the growth of this branch of education from the little school house, which was the original Harvard, up to the present time, giving statistics as to the number of teachers, schools, and pupils engaged, and the money which has been expended and is being devoted to it.

Following these remarks, he said that not much less of the wealth of this world has been used for religious training, while little or nothing has been given to that most important branch of physical culture.

He then proved very satisfactorily and emphatically that this physical culture, which is so much neglected in our country, is of the gravest importance, and should be one of the first considerations in every one's life. This he did by citing numerous examples, which have come up before him or before those with whom he is acquainted, and which served to illustrate each and every point as it was brought up. These points were: Any part of the body can be developed; symmetrical development should be aimed at by all; a teacher in physical culture is as important as one in other branches; the only correct way to exercise is with the clothes off; and athletic exercise is conducive to good brain work and health. He closed by offering to answer or try to answer any question that might be asked. One of these was: "How can we develop a gymnasium?" This caused a great deal of laughter and applause; but he gave us several ideas on the subject, one of which

was that a subscription list be circulated among our students, professors, alumni, and friends, to see what could be done in a financial way. This was started, perhaps hastily, by a student, as soon as the lecture was over, and resulted in obtaining promises for more than \$200 within a few hours. Now let this list be put under the management of an active committee appointed by the athletic association, and very likely it will result in something worth talking of. "Patience and perseverance will accomplish all things"; and if we make up our minds to have a gymnasium, we can do so; of course, not one like Harvard's, or that at Lehigh, but such a building and containing such apparatus as will do us as much practical good.

We could have our professor and a regular course of training like or similar to that adopted at the above named universities. At these places, there is given to each student a hand-book, which is used in connection with a system of examinations by means of which the physical condition of each student is accurately ascertained. The relative proportions of the different parts of the body; the undue development of certain ones; the comparative size of body and limbs; variations of height, breadth, weight, and muscular strength, from the normal standard for a given age, must all be taken into account in prescribing any useful course of physical training. This information, together with a variety of facts concerning personal history, bone and muscle measurements, and acquired or inherited tendencies to chronic or functional diseases, shows at once the immediate needs of the person under advice.

After the condition of the individual has been ascertained, the necessary apparatus will be marked, and the weight, the number of times, and the rate of movement will be clearly indicated throughout the book. The remarks on exercise, diet, air, sleep, and like subjects, which are contained in this little book, are supplemented by a course of lectures.

PROMPTED by the action of the faculty toward the resolutions regulating athletics, which were submitted to the college by the Harvard and Princeton advisory committee, we desire to suggest some changes in the roster, which the faculty might take into view at the time when the above rules come up for their final consideration. The reasons upon which these rules are based, and the number of conventions lately held, which had for their object the advancement of physical culture, show that athletics have become an important factor with every American college. It has furthermore been set forth, in the preamble of Rule III. of these rules, that they have become an important question with each and every student.

Though these rules may seem beneficial to the professors of the colleges by whom they have been drafted, yet are we, who have never overstepped our bounds, who have not as yet employed professional trainers, who have not played with professional teams, who have not played on any other but college grounds, and who have not caused men to remain at Stevens for the sake of taking part directly or indirectly in athletics; are we to be bound by rules and regulations as long as we remain within the required limits? We have held a fair position in athletics among our sister colleges; there is, however, no reason why we should not try and improve it. This can only be done by securing the assistance and co-operation of the faculty, and not when they place restrictions on the students which are distasteful to them. From time to time new studies are added to the course, always expecting a little more work, and encroaching further and further upon the few free hours that remain to the student, not even considering whether that time is used for study or in recreation. Why not allow certain hours each day for the student to recuperate his physical condition, in order to be better prepared to meet successfully the laborious and more difficult problem constantly looming up before him?

Even though the course be increased, it will not be advisable to extend the lectures, recitations, and laboratory work to more than six hours each day. This, we think, is the maximum limit at Stevens, as expressed by some of the members of the faculty; but why not arrange them according to a more systematic method, that is, of having the lectures and recitations begin for all classes at a fixed time in the morning, and the drawing, laboratory, and shop work hours at a definite time in the afternoon? As at present, our college duties are such as to admit of but little outside occupation during the day in the shape of study or athletics. Let us suppose that the hours are changed from the present disorderly condition to nine to twelve in the morning, and one to three or four in the afternoon. That is, the college duties be suspended for one hour only at noon. The disadvantages thus incurred would be but few; the advantages many. Perhaps one of the former would be that the professors now living out of Hoboken would have to start earlier in order to begin their work at nine; however, the hours might even be so arranged that it would not affect these.

The advantages would be, in the first place, in having regular hours for work, that great desideratum which is the aim of all institutions of the government and of learning. Students that are continually late and absent ought to be made to be punctual at early recitations; if they cannot be at college at nine, one can hardly expect them to be at work at seven and eight after graduation. If college duties were suspended promptly at noon, it would cause the recitations to begin on time, so that the time allotted to one department will not be taken up by another. This running the recitations and lectures over the hour does not only considerably shorten some of our most important branches, but it also causes a disturbance by the passing of the classes through the halls, to the annoyance of the other classes attending recitations, thus using several minutes of their time. The only way of remedying this evil would be to sound a large gong (to be heard

over the entire building), at the conclusion of the hour, to dismiss the classes, and one five minutes later to resume work. There are some gongs placed about the Institute for this purpose, but this is where their utility ends, for they never ring on time. Again, some classes being detained until one o'clock and later, are much disturbed by those dismissed at twelve, by the continual passing of the latter through the halls, so that it becomes often an impossibility, though sitting in the front row, to hear the professor lecturing. Again, being dismissed at all hours causes great annoyance to the students in receiving their meals. Those who are dismissed early require their meals early; others, finishing their hours later, receive theirs correspondingly later, and the result is, a cold meal, and, as it oftentimes happens, "getting left" altogether.

Let us now consider the hours in the afternoon. Some professors resume work at one o'clock, others at two, and still others at half after two. The time is thus, in some cases, shortened to about three-quarters of an hour in which to prepare one's self for the laboratory and shop. In the season of out-door sports many wish to be excused before the close of the afternoon hours, in order to avail themselves of base-ball and foot-ball practice, or in order to see the match games which are to be played. This would entirely be done away with if some other system were adopted.

With the number of students now at Stevens, there is no doubt that the gymnasium which we now use could be secured during the winter, by the more enterprising, for an hour or more each day during the afternoon.

At Harvard, no match games of any kind are allowed before four, thus giving them ample time after that hour to practice together. At Yale, no recitations or lectures occupy the time between the hours of two and four, and the members are conveyed in coaches to the athletic grounds, two miles distant, and returned in time for the four o'clock lectures. At Lafayette, no match games are allowed on the home grounds, with other colleges, except-

ing on Saturdays; however, there are no recitations between one and four in the afternoon, which time may be used in studying or athletics. No doubt there are other colleges in which rules similar to these exist. We, however, have no such rules, and no time is allotted to us in which we could practice together, the teams practicing when the professors feel inclined to excuse them. Match games are promiscuously arranged, and the captains have the members excused who happen to be engaged on days upon which the matches fall. As each class at Stevens is free one afternoon a week, why not change the roster so that all classes are off at once, and allow matches to be played on that afternoon and Saturdays? We doubt whether the time which would have to be sacrificed by one or other of the departments through such changes would exceed that which is lost by the number of students who shirk work. In this age of experimentation, a trial of one term on the above plan could certainly not do much harm; should it, however, be found to be injurious or detrimental to the interests of the college, there always remains one alternative, and that is to fall back on the present system.

We must heartily thank the faculty for the kindness displayed toward the students by the consideration of former proposed changes, and we doubt not that the above, when carefully considered, will lead to a result more conducive to the interests of the college, and to athletics at Stevens.

Scene: The Bakery, 12:30 p. m.—Baker: "Well, young man, what have you had?"

Freshman: "Well, lemme see. I've had two tarts, one pretzel, half an apple-pie, an' one of them, an' two of them, an' two of them."

Professor, while explaining the cycles met with in the combination of Adiabatic and Isothermal curves of expansion, numbers them I., II., III., etc.

Funny Senior: "Wouldn't that second one be a bicycle?" The class groans.

OBITUARY NOTICE.

MR. WILMER G. CARTWRIGHT, of the class of 1882, and for two years an assistant in the Department of Engineering, and assistant in charge of the Mechanical Laboratory of that department of the Stevens Institute of Technology, died in Jersey City on Saturday, the 23d of February, of typhoid pneumonia, after an illness of about two weeks' duration.

Mr. Cartwright was a native of Oswego, N. Y., and was 28 years of age. He evinced great fondness for scientific pursuits at a very early age, and was also much interested in the constructive branches of engineering. He was especially fond of chemistry, and took the Priestly Prize in the Department of Chemistry at the Institute. He entered the Institute at a more advanced age than usual, having been in business before coming to Hoboken. After graduation he began a special course of post graduate study, which was given up when the work of the Mechanical Laboratory became so engrossing as to take all available time. During his connection with the Mechanical Laboratory he made some peculiarly interesting investigations, including a study of the distribution of heat, in useful work and wastes, in gas engines of several sizes and different makes. He was engaged at the time of his death in an investigation of the efficiency of worm and of spur gearing, and had nearly completed one line of experiment.

Mr. Cartwright was a quiet, steady, reliable worker, taking real interest in the problems presented in the course of his business, and exhibiting great intelligence, ingenuity and skill in their solution. Professionally, he was a man of unusual promise.

His personal character was also admirable; but his quietness, reticence, and repugnance of all self assertion were such that only his most intimate friends were aware of the excellence and the strength of his character. Kindness toward his juniors and subordinates, respect and consideration for those who were his seniors in age or his official superiors, earnest affection for his family and friends, a high sense of honor, appreciation of trusts confided to him, with great self respect, were distinguishing characteristics of the man. He was honorable and faithful, of high moral principle, and of unexceptionable habits. The world can ill spare such men.

INSPECTION TOUR OF THE CLASS OF '84.

In accordance with the notice printed in the last number of the *INDICATOR*, the Senior Class made its visit of inspection to the works of the Bethlehem Iron Company and also the Lehigh Zinc and Iron Works on Saturday, March 1st.

The Lehigh Valley Railroad very kindly placed a car at their disposal, and carried them from Jersey City to Bethlehem, thus making the trip to and fro exceedingly enjoyable. On the arrival of the train at Bethlehem, one of the locomotives of the Bethlehem Iron Company was attached to the special car and moved it to the works, thus saving the students an unpleasant walk, and landing them in a body where they wished to be.

Prof. Denton then leading the way, the class moved on to the large converters, one of which they saw operate, and then walked over to the Eagle Hotel, where they enjoyed their dinner.

By the judicious management of Prof. Denton, the class was divided into three sections, one under his guidance, another under Mr. Riesenberger, and the third under Messrs. Kletzsch and Jacobus, two members of '84, who went over the works the day before. These sections were quite easily handled, containing only ten or twelve students, and a very complete inspection was made by each.

These works consist of a Bessemer plant, two large rolling mills, six blast furnaces, and also the necessary foundry, machine shop, etc., for construction and repairs. With the network of railroads surrounding this part of Bethlehem, these works have ample facilities for the transportation of fuel and ores from their own and other mines to the works, and outlets for the distribution of the products. The construction of the Bethlehem Iron Works was commenced, in 1860, with the erection of an iron rail mill, a puddle mill, and one blast furnace. In 1863 the second blast furnace was built, and No. 3 was added by purchase from another company. The Bessemer works and new rail mill commenced building in 1870, and operations in the former were begun in 1873. The spiegeleisen furnace was built in 1874, and in the same year the construction of the two large blast furnaces, which are among the most noteworthy features of the place, was commenced. These furnaces, known as Nos. 5 and 6, were put in blast in March, 1876, and March, 1877, respectively.

The entire plant has been erected from designs made under the superintendence of Mr. John Fritz, the machinery, engines, roofs, etc., belonging to the new portion of the works having been built, with a few exceptions, in the machine shops and foundry belonging to the works.

The plant may be generally described as follows: All the buildings are constructed of hard gray sandstone. On all the newer buildings the roof frames are of iron and the coverings of slate. The original iron rail and puddle mills are located between the Lehigh Valley Railroad and the river, the puddling end of the mill being on the river bank. Next below these are situated the machine shop, 253 feet in length by 64 feet in width, and the foundry, 107 feet in length by 64 feet in width. Then come five of the blast furnaces, viz.: No. 1, the original, and its companion, No. 2, now enlarged; the little spiegel furnace, No. 4, and the new ones, Nos. 5 and 6; No. 3, the one purchased, being located a few hundred yards below these and on the other side of the track. The blowing and pumping engines and electric lighting plant are in one house, under one management, and entirely removed from the dust of the furnaces—an important practical consideration, by the interposition of the stock house, common to all furnaces. Steam is brought to them from boilers some distance away, but the loss is trifling in large and well-jacketed pipes.

The steel mill is a large and massive stone structure, having numerous and uniform arched openings in its side, and an iron and slate roof with a continuous lantern. There are two wings on either side, each 111 feet wide and 138 feet long. The total length of the main building is 931 feet, and its width is 111 feet. In this building there are two pairs of 7 ton Bessemer converters, with their cupolas, capable of turning out 17,000 tons of ingots per month. There is a good sized stock yard around the cupola end of the mill. The blowing and pumping engines are in the wing next the railroad, while the opposite wing is just being fitted up with new open hearth furnaces.

In front of the converters, and on either side of the main building, are two rows of Siemen's gas furnaces for heating ingots, with their charging and drawing apparatus. In the centre is a 32 inch three high blooming train. The bloom heating furnaces occupy the remaining central part of the main. Across the main building, between the other wings, there

is being set up the largest stand of rolls for a blooming train in the world, and is to be driven by a 4,000 horse power engine, having an enormous fly wheel weighing 90 tons.

A steam hammer for trimming blooms, cutting them into required lengths, etc., is placed outside but a few paces from this large engine. On the other side of the railroad tracks are the boilers and producers, standing below the level of the tracks, being thus conveniently situated for firing. The three high 24 inch rail and beam train is 120 feet long, and had an engine at each end, so that two sets of roughers and finishers were worked at the same time and at the required speed. One of these engines has now been taken down, and the train considerably extended into one of the wings. These are then to be run by the largest horizontal engine ever constructed, the foundation for which has been already laid. This is being built at the Bethlehem works, has 3 high and 3 low pressure cylinders, and is to generate 10,000 horse power. It is now in course of construction, and will require another year for completion. The other wing at this end of the building is reserved for large and small merchant and special trains.

The rails coming from the train are carried on rollers to the saws. These can be placed at any distance from each other, and being driven by the same shaft, the required accuracy in the length of the rails is insured. The finishing end of the building is so long that 60 foot rails can be readily sawn, hot straightened, cold straightened, and punched, neither operation interfering with the others. The machine for bending the rails in the opposite direction to that which they take in cooling, attracted much attention of the students, and was much admired for its simplicity by them.

Furnace No. 3, which is 50 feet in height, is known as the "Northampton Furnace." It produces 160 tons per week.

No. 4 is 23 feet high, and is used in the manufacture of spiegeleisen. So also are No. 5 and No. 6, they being 70 feet high, and producing each 350 tons per week. The furnaces are all worked with taps, and Nos. 5 and 6 are provided with Lurmann's closed front. The usual charge, when using 50 per cent. ore, is:

Anthracite.....	5,200 lbs.
Ore.....	4,000 "

Limestone varying in quantity from 50 to 60 per cent. of the charge, as circumstances require. The boiler and boiler houses are

placed between the furnace and the river. The setting of these is peculiar, and perhaps the only one that provides completely for expansion in every direction without subjecting the boiler to injurious strains. Each is suspended by 16 brackets, and these are upheld by four equalizing beams, which rest on two heavy girders extending across the building.

There are two main batteries, each containing 7 boilers. The upper ones are 70 feet long by 40 inches in diameter. The lower shells are 30 inches in diameter. The blowing engines are of two types, compound and single, and are 6 in number. The compound engine has a 30 inch high pressure and 54 inch low pressure cylinder by 80 inches stroke. The air cylinder is 80 inches in diameter, and the three pistons are attached to the same cross head. The plunger air pumps are 20 inches in diameter by 36½ inches stroke. The cut off is so arranged that the steam expands four times. These engines usually make 20 revolutions per minute; have run with 24, and may with safety run faster. The usual blast pressure for anthracite coal in the large furnaces is 10 lbs. per square inch.

This type of engine was designed by Mr. John Fritz, and embraces some novelties of arrangement which results fully justify. The blowing cylinder is placed at the fly wheel end, a reversal of the usual arrangement. This is done for the purpose of placing the steam cylinders and their valves, which most need attention, where they can be conveniently got at. The blowing cylinder, which requires least attention, occupies a less free space between the shaft cross head and fly wheel. In the puddle mill there are 14 double puddling furnaces and a heating furnace of the ordinary type, and boilers are set over all of these. There is also a 12-inch train, making this mill compact and convenient.

The double furnaces are now being replaced by improved ones, known there under the name of "Stubblemeyer's Monkey." These save over 33 per cent. of fuel, and are built upon the principle of flame deflection. The production of the puddle mill is about 2,500 tons of iron rails per year.

After going all through the Bethlehem Iron Works and seeing all that was to be seen in so short a visit, the class next went to the Lehigh Zinc Works, above mentioned, which are located but a short distance from the iron works.

The products turned out here are metallic zinc, oxide of zinc, and spiegeleisen.

The latter is made from the residue of the ore after the zinc has been removed by sublimation. The oxide is made by mixing finely crushed ore, which contains about 15 per cent. of zinc, with equal portions of coal. It is then placed upon a bed of live coal in furnaces which connect with an iron pipe leading to an immense chimney. The substances driven off by the heat, and containing large quantities of oxide of zinc in the state of very fine powder, are carried into this chimney, where they are separated by their weight, the oxide rising and being carried further by a fan, while the impurities settle at the bottom. After going through the fan, the oxide passes through a large chamber with thin sides so as to be cooled, after which it is distributed into a series of pipes. These have openings in their lower sides, about which are suspended long bags. The air and gas is thus allowed to escape, while the oxide is caught. After this it is ground.

Metallic zinc is obtained by heating the ore in clay retorts, when it comes off in a vapor and is condensed.

EXAMINATIONS.

Occasionally we are pleased to observe, in newspapers from various parts of the country, a notice of the adoption of a resolution, by the Board of Education, providing for the omission of the examinations now held semi-yearly and otherwise making the promotion of the student depend on his record as made during the term.

This is a move forward in the right direction; a move long advocated by physicians and the greatest thinkers, and we think the 19th century is doomed to witness the day when every high school and college in the country will base promotion on the steady, healthy everyday work, and not on the unnatural hot house preparation that is specially made for the final week.

The barbarous practice of examinations is synonymous with the old Indian custom of running the gauntlet; each professor taking his whack at the victim as he runs the line. That our present age, which we consider civilized, is not above such inhumanity, is surely lamentable. The time has come for a halt, and it cannot be made too soon.

The evil of the present *high pressure* system does not lie in the course of study, the hours of session, or methods of teaching. Nothing

is to be complained of on that score. The student accepts those when he becomes such ; the damage follows after.

For a month preceding examination week, he is in a constant state of high excitement and perpetual fever. The anxiety that he will not "pass" falls on good and poor student alike, and no matter what the average of term work has been, the victim is in a state of nervousness and apprehension that follows all the hours of waking, and rides, like a nightmare, across the hours of sleep. All time is given to study and none to exercise or relaxation. His capacity is strained to its utmost, his nerves are screwed to their highest pitch, and the damage done to mind and health can scarcely be overestimated. The professor usually does not see the effects of overwork ; but go to the parents or those intimate with the student, and you will get a deplorable account of sick headaches, nervousness, and general indisposition. Or, if the testimony of these is not sufficient, consult some of the oldest and wisest physicians of every college district, and you will obtain instances *ad infinitum* of the evils of examination.

Omit the examinations. Shut off some of the steam ; work the engine more economically, and relieve the student and the professor as well. That the steady work of the term or reviews, and not the "cram" of a few weeks, should tell, are our earnest convictions.

H. A. WESTMINSTER.

THE REIGNING CRAZE.

Did any one say banjo ? We hope not ; at least, we hope for his own sake that he did not say it loud enough to be heard, for his death would be on his own hands. It is almost madness for a lover of that style of music to attempt to make a banjo ; some time ago nothing would have been thought of it, but now ! the questions that are asked are enough to drive even the strongest minds off their centres. What kind of a staff are you going to put on ? What size rim, and where did you get it ? Did Hawkridge make it for you ? Going to put on raised frets ? Where did you get your brackets made, and how many are you going to put on ? These are a few of the queries put to the brave young man who starts to make a banjo.

There was a time when you could scarcely go down to the ferry without meeting some enterprising young instrument maker, walking

proudly along with a banjo rim in his hand just from New York, where it had been nicked. But now everything is changed ; you meet a fellow student coming from the ferry with a suspicious looking bundle under his coat ; you sidle over to him to pass the compliments of the day, but he seems to be in an awful hurry—can't stop for anything ; you begin to think he is very uncivil ; but he isn't. I'll tell you what he is, though ; he is making a banjo, and don't want any one to know it.

We don't know how long this craze is going to last, but we saw a notice on the bulletin board the other day of a banjo for sale. Two of the sophs. must have gone into the business, judging from the number of staves recently seen in their possession.

THE STEVENS HAT.

The college hat is supposed to be a soft felt of a bright red color, and we think that it is about as sensible a hat as can be obtained ; yet, they are but little worn ; why, it is difficult to tell. The hat is a comfortable one, and also inexpensive—just the thing to wear about in the shops and foundry. It can be sat upon, dropped on the dusty floor, used as a football, and yet its purpose as a hat will not be injured to any considerable extent. It has but one color, is not easily confused with any other college cap, and possesses a kind of character of its own. The objection is raised against it that it is nothing but a tennis hat, and is worn by many young men who are not college men. It would not be difficult, however, to have some distinguishing mark added to the simple red, which would make its identity certain, such as a circle of white or black on the crown. Stevens should have a hat, and until something better is proposed, the red soft felt should be worn by all the students.

THE NATURAL PERVERSITY OF STUDENTS.

Are all students bad ? Yes, they are ; they are born that way—at least three-fifths are, and the others are made bad by association with those who inherit the peculiar faculty of having a little fun out of everything that turns up. A few, however, we do not say anything about, as they are above reproach. The following incident, we confidently hope, will prove beyond a question the natural characteristics of the above mentioned four-fifths of college student—

A certain professor having in the course of one of his lectures to use a very explosive compound, took care—of course unknowingly—to leave a large quantity of the compound on some filter papers, saying, at the same time: "If any of the students should happen to carry any of this compound away, be very careful, as it is frightfully explosive, and above all, do not take any of it into Prof. Woods' room."

Unfortunately for the good effect of the last part of the advice, the class, on leaving the chemistry room, went direct to Prof. Woods' room; it was not our fault, because the roster directed us that way, and somehow or other some of the explosive found its way to the floor of the room. I can't for the life of me think how it got there, but it was there, and announced its presence in a very emphatic manner every time a student's foot came in contact with it. Of course nobody laughed, but tried to look as solemn as the occasion demanded.

Every now and then reports of all degrees of loudness were heard in the hall and in our recitation room. We are anxiously waiting for an invitation to visit President Morton in his office, although, of course, we did not have anything to do with it.

EM.

AN EPISODE.

It was a cold and wintry night, and the snow, falling thick and fast, was picked up by the wind before it could touch the ground, and whisked and twirled around the corners, into cracks and across the pavements, until it was finally drifted into the gutters and heaped up against the houses on either side of the street. Scarcely a sound could be heard, save the continuous soft noise of the falling snow. Once in a while sleigh bells would ring out upon the air, and a sleigh would drive swiftly by, as if the riders were afraid lest they should be covered up by the ever-shifting drifts. The flickering street-lamps and the lights from the windows of the houses had but little effect in piercing through the whirling clouds of snow, so that the darkness of night settled down with more than its usual gloom.

The town clock had just struck ten, when a street door opened and a well-wrapped form stepped out into the darkness and cold. He takes his way up Hudson street, and by his manly tread, battling his way against the driv-

ing storm, we know him to be one of our noble Freshmen. His course seems to be directed toward the college building. Can he be going there at this time of night? No; for he passes by, and, continuing his way, evidently reaches his destination. He pauses before a handsome stone front house; he mounts the steps and rings the door-bell. Ah, boys! can you not tell by his assured and yet hesitating movements that he is going to visit his best girl? Hark! he hears the footsteps of his love coming to open the door for him. He steps back to stamp some of the snow from his feet, but that step was one inch too far back; he tumbles down into a drift at one side of the porch. Just then the wind blows an immense avalanche of snow off the roof of the house and completely buries him. The door opens, and a maiden peers out into the darkness. Alas! she sees not the well-known form of her lover. Can her ear have deceived her? She waits a few moments, listens intently, and then apparently convinced, returns into the house and closes the door.

Meantime a struggle in the snow-drift is going on; the bank of snow heaves and lifts itself as if it were alive. At last our friend forces his way out and rolls upon the pavement free from his burden of snow. At this moment a Hoboken policeman comes along, and seeing a young man lying upon his back, naturally thinks that the man in this strange position is drunk, and, lifting him roughly by the collar, exclaims: "Ach, I have ye now, ye spalpeen. Come along with ye, or it's me that will give ye a taste of me club!" Next morning a sad young man is seen leaving the police station, and is heard to mutter, as he walks toward his boarding-house, "It's a cold day when I go to see Minnie again!"

ALBITAN.

Prof.: "Well, you take these rings and join them end to end." The extensibility of this imaginative brain is due probably to its great ductility.

Prof.: "Well, Mr. Blank, have you finished your problem?"

Mr. Blank: "I have finished it, sir; but am not quite certain it is correct."

Prof.: "You ought to know, since you had your book open, and all the back of the class to help you."

Stuffing Box.

Gymnasium, where is it?

"Wait till the clouds roll by."

Preps! Stay on your own side of the fence.

Our "battery" for the nine is doing good work.

The Glee Club is in better condition than it has been for years.

One of Hoboken's lucid signs:—"Boots blacked inside."

Some of the Seniors look solemncholy—skating is about over.

The time is near at hand when the midnight oil will begin to volatilize.

Lacrosse has been undertaken with sufficient energy to assure success.

If Prof. Wall is correct, surely we have a great "inspiration" among us.

Some of the Sophomores are working on their third drawing for the year.

Burhorn, '85, was seriously injured by the exploding of a crucible in the laboratory.

Dr. Mary Walker rides a bicycle now. She uses a 64-inch machine—so rumor has it.

There would be some interesting notes from the alumni—if we had an alumni editor.

It was curious to see how many athletes we were *going* to have after Prof. Blaikie's lecture.

Why don't the Freshmen come out with high hats and canes—time's up—the "22d" is past.

Boynton, '85, has left college and is taking a special course in chemistry under Prof. Leeds.

A new cheer and a neat serviceable college cap would be improvements for the coming season.

Ed. P. Thomson was the first to respond to the circulars issued by the Business Editor asking for subscriptions.

Each class should have a separate room for its own use. The lower classes greatly feel the need of this change.

Prof. Mayer has completed his very interesting lectures on magnetism, and has taken up the subject of electricity.

The fertile imagination of French writers is remarkable. If any one doubts the statement, let him ask a member of '87.

Mr. Beard is often seen wearing the Stevens hat. It is hoped that many members of the Freshman class will follow his example.

Our columns ought to receive some valuable matter from Seniors, whose time is less occupied than that of the other classmen.

One of the Freshies was brought into prominence lately as one of the "Babes in the Woods" at an entertainment in town.

Personal ease in the Reception Room, when the engine is running in the basement, is at as great a discount as a trip on the James Rumsey.

A Freshman, returning late from New York one evening (church night), attracted considerable attention by his endeavors to walk up a lamp post.

A student wants to procure a cornet; a student wants to sell a flute; the orchestra wants a cornetist. For information see Local Editor, '86.

A member of the Faculty was actually heard to inquire the way to Prof. Wall's room. Here is an opportunity for illustrated sign posts.

The young and tender Lehigh Burr gives much useful advice as to the best method for running a paper. Experience is an immense instructor!

A subscription list has been started for the new gymnasium. It is an object worthy of liberal attention by the students, alumni and all our friends.

Some few still appear to remain ignorant of the purpose the coat-room was provided for. Mr. Donaldson ought to have an *artistic* notice put up on the door.

Some of the ladies at '84's reception remarked that the Seniors are bashful. '84 feels proud of her modesty; but would like to hear their opinion of the Juniors.

Mr. Page, of '87, is quite ill with the measles, and his pleasant face is much missed by his fellow students. It is hoped that he will soon be back in his old place.

The Senior Class have been excused from Kinematics, part of Prof. Thurston's work, designing for Prof. Carr, and there will be no thesis work until third term.

Prof. Wood now lectures to the Freshman class once a week on the subject of Mathematics. These lectures are thoroughly enjoyed by every member of the class.

A youthful Sophomore, fearing his talents would be exposed in the columns of the INDICATOR, threatened to "slug" each member of the Board of Editors respectfully.

Mr. Parsons, of '87, has had a severe attack of malaria. We are glad to state that he has returned to college, and, although not yet looking quite well, is much improved in health.

Senator Riddleburrger, of Virginia, and General King, of Louisiana, were some of the distinguished visitors attending the experiments in the Physical Laboratory last month.

According to one who has passed in optics, a foot of one of the team in the foot-ball photograph is out of proportion with the man's leg, because it was "too much focussed."

One of "our brightest," an officer of the S. I. T. Yacht Club, is consoling himself over the loss of a race. His compass was out several degrees, and consequently (so he says) sailed too far.

Some bright mind suggests a remedy for the habit of the Sophomores "refreshing" their sluggish memories in calculus during recitation. Bind the books with sheet iron and magnetize Prof. Carr.

The floor on Prof. Wall's room is noticeably tending to double up. An accident insurance company might do a lucrative business among the students who have to risk their limbs in this precarious place.

A Sophomore struts about and endeavors to inveigle the innocent into the belief that he received \$25.00 for a *professional* opinion. This is about equal to the Junior who puts an M. E. after his signature.

The possibilities of improving the tower of the Institute building are many. Let some one of the great in '84 propose that their class club together and have it done, instead of planting a tree at graduation.

The Preps have not only usurped the entire campus, but now enjoy themselves in innocent foot-races up and down the library. For want of a better use, we suppose the library will have to put up with this annoyance.

Either footstools or floor straps might be added, with great propriety, to the equipment of Prof. Wall's lecture room; so that those of

us whose weighty brains tend toward the earth's centre while their heels fly heavenward could be comforted and their near neighbors benefited.

This year's influx of college annuals has begun. Those which have happened this way are replete with interesting lists of their corporations, trustees, students, and, most prominent of all, eating clubs, with very little reading matter of interest. We hope our annuals this year will be of a more entertaining character.

Although we are thankful for all subscriptions, we do not feel that we are under any obligations to the subscribers, especially in the way of extra copies of the INDICATOR. Some of our subscribers seem to think that the fact of their being subscribers entitles them to an unlimited number of single copies. We beg to dispel this illusion.

The students will please recollect that the "Sanctum" is a part of Prof. Carr's office, and granted to us by his kindness. We hope that the unwarranted intrusion of some of the upper class men into the "Sanctum" will not be repeated, as it seriously reflects on their character to enter a room belonging to a professor, without even the formality of knocking at the door.

Modern art reached one of its highest pinnacles when that variegated notice, especially directed to smokers, was produced. There were some objections to the design, however, and it is undergoing improvement under the guidance of a few æsthetically inclined Sophs. Meanwhile "Prof." Donaldson goes about much after the fashion of a roaring lion, etc. It is rumored that he paid the artist a quarter for the effort—ergo.

The results of our requests for subscriptions from the alumni have been encouraging and very gratifying, with the exception of one, who heads his letters, when he doesn't use the backs of our printed receipts, as a patent lawyer. A slight error in mailing him a notice of publication, with another alumnus' name directed thereon, was too much for one of his position in society. Probably he had just lost a case, and so is somewhat excusable. But his sentiments, which were scribbled on the back of our notice and returned for our edification, rather betokened one whose chief occupation was the manipulation of tin locomotives and express wagons with pink strings, than one who probably bears the title of an M. E.

PERSONALS.

'75.

G. K. DICKINSON is a practicing physician in Jersey City, N. J.

T. F. KOEZY, for many years with the house of Gillis & Geoghegan, manufacturers of steam heating and ventilating apparatus, has recently accepted a position in the New York Steam Company.

'76.

MARRIED, on Thursday, February 14, 1884, at the residence of the bride's parents, by the Rev. G. C. Haughton, assisted by the Rev. E. C. Haughton, William Diehl, of Philadelphia, to Annie, daughter of I. Menzies Livingston, Esq., of Hoboken, N. J.

G. C. HENNING has opened an office as Inspecting Engineer at No. 18 Cedar street, New York, and will give special attention to all kinds of steel and iron constructions.

WILLIAM KENT was present at the Cincinnati meeting of the American Institute of Mining Engineers, and took a prominent part in the discussions.

'77.

W. J. COOPER is book-keeper for the First National Bank, Newark, N. J.

'78.

PAUL KUDLICH is prosecuting his studies at the Royal Art Academy, Munich, Germany.

J. F. KELLY represented the interests of the United States Electric Light Company at the recent tests at the Institute.

E. P. THOMPSON is with the Brush-Swan Electric Light Company, Englewood, N. J.

'80.

G. M. BOND lectured on the evening of February 29th before the Franklin Institute, Philadelphia, on the subject of "Standards of Length as Applied to Gauge Dimensions," explaining the methods of work adopted by the Pratt & Whitney Co.

J. W. LIEB, on January 1st, received the appointment of Chief Electrician to the Italian Edison Electric Light Company, the outgrowth of the experimental installation at Milan.

DURAND WOODMAN is chemist at the Weston Factory, Newark, N. J., of the United States Electric Light Company.

'81.

H. S. POPE is travelling for the house of Thomas J. Pope & Bro., dealers in metals, New York.

EXCHANGES.

Among our pile of exchanges, the first to strike the eye of the Exchange Editor is a pleasant-looking magazine, having on its cover the picture of a half-opened chestnut burr, and the name *Lehigh Burr*. The general appearance being pleasing and the device pleasing, the editor starts right here.

The contents are found to be of varied flavor. On the second page we find the sugar of approbation in the shape of a commendatory notice of our efforts to shake off the preps. Scattered around liberally we find the laughter-inducing element, and clear over near the back is the tonic in a criticism of the weak points of the first number of the INDICATOR. The medicine is rather bitter, but we take it, hoping to improve.

The *Lafayette College Journal* calls especial attention to an article contained in it on the question now being much agitated in colleges, whether Greek shall be abandoned or not. Although students of a technical institution generally possess so little classical knowledge that the subject possesses no great charm for them, still we are all interested in culture and interested in seeing that maintained which, as the writer says, although "not capable of buying a loaf of bread, or building a bridge, . . . helps to make a man." The writer presents the subject very well; his reasons advanced for the retention of the language as a study being sensible and such as may be appreciated by all. It does refine and polish, and also cultivate perseverance and patience. It is evidently unwise that Greek "go" altogether. But when, on page 80 of the *Journal*, we find the statement that in New York City there are three thousand college graduates incapable of earning a living, it certainly seems that there is a happy mean to be struck between the making of a "machine" and of a merely cultured man.

The *Journal* also contains a full account of the recent meeting of delegates at Lafayette on January 19th for the formation of a baseball league.

The *University Magazine*, of the University of Virginia, is filled with a pleasing variety of matter. "A Minute in a Far-off Spring," which is Article No. 3 of the series, "Under the Arcades," is a well-written sketch, displaying feeling and a pleasing style of expression. The column of "Dont's," suggested by and modelled after the recently published

book of the same title, is apt, and many of its injunctions are as worthy of heed as those of the original.

The *University Herald* devotes considerable space to the publication of two or three essays, which, we should judge, have been written in competition. The "Locals" are very entertaining, even for an outsider. We read also of the acceptance, by Prof. Schill, of the position of professor of music. We congratulate the students of the University on the accession of a musician, who, in so short a time, has won such high praise as he has received from the musical public.

The *Oberlin Review* is largely occupied by an account of a recent oratorical contest, and accompanying it is a rather novel article, consisting of the opinions of the contestants as to the effect of the contest upon students and institution, whether beneficial or otherwise.

The *Adelphian*, the publication of the Adelphi Academy in Brooklyn, is a neatly gotten-up magazine, the mechanical execution being in every respect excellent. The February number is rendered still more attractive by a pleasing little frontispiece, the production of a lady student of their art department. The contributions are very readable.

The *Concordiensis*, of Union University, Schenectady, is an unpretentious but finely printed and arranged paper. The quality and quantity of the contents manifest a great deal of industry and talent, even for thirteen editors and a business manager. Although sorry that the students are compelled to raise a howl, still being compelled, we are glad to see them performing their duty in "kicking," as they do.

We are sorry to note in any '85 man such a strong desire to "shuffle off," as is manifested by the author of "The Old Kitchen Fire."

The *American Machinist* is, as usual, crowded with the most useful information. Among the articles we notice especially one on the construction and use of the milling machine, an article of a series on locomotive running, and a description of the Prony brake used by Messrs. Mitchell and Aldrich in experimenting on an engine at the American Institute Fair. Those of our readers who are not in the habit of reading this paper we would advise to do so. The articles are of that practical nature which makes them of not a whit less importance to the engineer than his text-book information.

The remarks just made apply with equal propriety to the *Electrician* and *Electrical Engineer* and to the *Electrical Review*. Herein will be found information fully sufficient to keep the reader up to the times and perfectly acquainted with all developments, practical and theoretical, in this rapidly growing branch of science and industry.

We would also acknowledge the receipt of the following additional exchanges: The *Kenyon Advance*, *Tech. North Western*, *Queens College Journal*, and the February numbers of *Mechanics*.

CHIPPINGS.

Pater: "Well, my boy, how do you like College? Alma Mater has turned out some good men." Young Hopeful: "Ya-as, she's just turned me out!" He had been expelled.—*Ex.*

Love: Young Simpson (to the lovely Felicia, as they stand on the piazza in the moonlight): "Miss Felicia, this world looks so dreary and lonely to me I feel as if no one loves me." Felicia (in a sympathetic tone): "Oh, Mr. Simpson, God loves you!" Simpson, after a thoughtful pause, suggests that they go in, as it is growing chilly.—*Life.*

Prof. in Physics: "Mr. W., what, in your opinion, is a good example of a non-conductor?" Mr. W.: "A driver on a bobtailed car." (Appreciative murmurings of applause from outer utterances.)—*Poly.*

GREEK RECITATION.—Benevolent Professor (prompting): "Now, then, *Eipas* —" Somnolent Soph. (remembering last night's studies): "I make it next." (He goes it alone before the faculty.)—*Ex.*

First Freshman to second ditto: "Did you get her photo while you were away?" Second Freshman: "Well—ah, the fact is she gave me her negative."—*Princetonian.*

"You are as full of airs as a music-box," is what a young man said to a girl who refused to let him see her home. "That may be," she replied, "but I don't go with a crank."—*Ex.*

He was a facetious Sophomore: "What quantities of dried grasses you do keep here, Miss Smith? Nice room for a donkey to get into." "Make yourself at home," she said, with sweet gravity.—*Ex.*

Scene.—Class in Roman Law. Instructor : "Now, we see that the husband bought the wife and the wife bought the husband." Witty Senior : "Then they were both sold, wer'n't they?" Instructor (who doesn't see the point): "Yes, they were both sold." Class grins audibly and instructor tumbles.—*Ex.*

Speaking of chemical matters, we are reminded that a uniformed professor lately said that matches were of very recent date, upon which a bright member of the class remarked that it was an error, as Adam and Eve made the first match, which was an explosive affair, raising Cain.

We have a faint suspicion that the above joke is as ancient as the match itself.

Mr. M. to his friend G.: "Fifty years from now I think there will be plenty of women running steamboats and railroad trains." G.: "Never; that won't be *fast* enough for them *then*."

The students who are taking French are anxious to use Sarah Barnum as a text-book.—*Burr.*

First Student : "Can two directly opposed feelings exist at the same time?" Second Student : "Yes, joy and sorrow; when the Professor is ill and cannot hear the recitation."—*Beacon.*

LOGICAL SEQUENCE.—A comfortable reflection for the indisposed—a lazy boy is better than *nothing*. *Nothing* is better than a studious boy. *Therefore* a lazy boy is better than a studious boy.—*Ex.*

GOT LEFT.

"Meet me," she said,
"To-morrow night
"At the garden wall
"When the sun's gone down."

And here's to-morrow,
And here am I,
And there's the wall,
And the sun's gone down.

—*Lampoon.*

PATTI'S DIAMONDS.—Among Patti's half-million dollars' worth of diamonds are many that came from the crowned heads, three kings and two queens being among the donors. There is a man in Chicago who used to wear diamonds who is now wearing pawn jewelry, owing to his having three kings and two queens mixed up in the affair. The other man held three aces and a pair of jacks.—*Peck's Sun.*

'85 should remember, "That to be forewarned is to be forearmed."

Professor to very noisy class : "Order, gentlemen, order. I am very sorry to see so much electricity in your heels, for we know *positive* electricity at one pole implies *negative* at the other."

ODE TO SPRING.

O fly,
That buzzest on the wall,
Take care thou do not fall,
Though climb'st so high.

O fly,
Thou surely dost not know
The glee and yet the woe
Thou bringest to I.

You see
Whene'er I hear thy wing,
I always think of Spring
And all that sort of thing;
Of spring suits and straw hats;
Of tender moonlight chats
Of pretty coaxing girls,
Banged hair and flowing curls;
Of woods and vales and rills;
'Tis then my spirit thrills
With glee.

—*Amherst Student.*

THE COLLEGE WORLD.

COLUMBIA.—Columbia has resigned from the Child's Cup Association. Cornell was elected in her place.—Astronomical instruments, worth \$12,000, have been presented to the college.—The library is inspected by two detectives.—'86 has a class debt of \$600.—A challenge has been sent to Harvard for next spring's boat race.—Oxford caps have almost entirely disappeared.

HARVARD.—The term-bills last year amounted to \$173,000.—A committee from the Faculty met a deputation of the students to discuss the professional aspect of athletics.—Permission has been granted to play professional nines next summer.—The number of students is 1,522.

PRINCETON.—The Faculty prohibit sparring at the winter sports.—The *Princetonian* thinks that the anti-fraternity spirit is growing at that institution.—The number of students is 527.

YALE.—The Glee Club asked \$1,200 for damages from the Ohio and Mississippi Railroad by reason of loss incurred in failure to meet engagements, etc.—The Freshman nine has four candidates for the position of pitcher, two for catcher, two for each of the bases, and three for short stop.—The football team has a surplus in the treasury of \$500.—The number of students is 1,092.

THE STEVENS INDICATOR.

THE
Stevens Institute of Technology,
SCHOOL OF MECHANICAL ENGINEERING,
FOUNDED BY THE LATE EDWIN A. STEVENS,
—AT—
HOBOKEN, N. J.

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THE Stevens Indicator.

Vol. 1.

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No. 4.

The Stevens Indicator.

PUBLISHED ON THE

10th OF EACH MONTH, DURING THE COLLEGE YEAR,
BY THE STUDENTS OF

Stevens Institute of Technology.

Editors.

EDITOR-IN-CHIEF, C. W. WHITING, '84.
BUSINESS EDITOR, A. P. KLETZSCH, '84.
EXCHANGER EDITOR, JOHN M. RUSBY, '85.

Local Editors.

ROLLIN NORRIS, '85.
E. P. MOWTON, '86. C. R. COLLINS, '86.
LADD PLUMLEY, '87.

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Professors, alumni, undergraduates, and friends, are invited to contribute literary articles, items, verses, discussions of current topics, and personal notes.

It is particularly desired that Alumni furnish us with all items of interest concerning themselves and every one who has been connected with the Institute.

It is expected that all articles shall be written in a courteous tone.

The writer's full name, as well as his NOM DE PLUME, must accompany the article, as assurance of good faith and reliability; but it will not be published, unless desired.

The editors do not necessarily endorse sentiments expressed except in the editorial and exchange columns.

Publishers are invited to send us books and magazines for notice or review.

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All persons wishing to secure the business patronage of students and alumni, will find it to their advantage to ask for our advertising rates.

ON the 7th of March the Junior Class was tendered a reception by Professor and Mrs. Thurston. There were a number of young ladies present, as well as the wives of several of the professors, and everyone appeared to have a pleasant time. As '85 has no glee club, there was no singing by the class, but one of the ladies present kindly sang a number of selections, which were much enjoyed.

In the INDICATOR of March, '84 wants to know the opinion of the ladies in regard to '85. In answer, we can only repeat a remark made by one of them who attended both receptions. The Senior reception being mentioned, she exclaimed: "Seniors! Why I thought they were Freshmen and Sophomores!!"

We are sorry for '84, and wonder when she will lose her verdancy.

PROMPTED by a call of the Athletic Association of Columbia College to similar organizations of the other colleges of the country, eleven of the latter sent delegates to a meeting which was held Saturday, March 29, at Hamilton Hall, Columbia College, for consultation and interchange of views concerning the proposed athletic regulations.

The meeting was opened by Mr. Woodworth, of Columbia, who stated the object of the call. A lengthy discussion then took place, after which a vote was taken on each of the eight resolutions restricting athletics. This showed great disapproval, and when Mr. Sexton, of Harvard, introduced a series of resolutions, they were passed by all except St. John College.

These were as follows:

Whereas, We have listened to a full discussion of the athletic regulations by representatives of eleven colleges,

Resolved, That it is the sense of this meeting that the recent action of the committee appointed by the various college Faculties, in drawing up a series of resolutions regarding athletics, was unnecessary and inexpedient.

Resolved, That no abuses exist in inter-collegiate athletics which cannot be corrected by the students themselves, in their various conventions, when convinced that such abuses exist.

Resolved, That the students in the various colleges ought to have full control of the details of athletics.

Resolved, That the Faculties ought, in our opinion, to interfere only negatively, *i. e.*, to prevent neglect of college duties.

IT will be noticed, on perusing our paper further, that with this number there appears a column headed, "Communications," which has not appeared heretofore. The idea is an old one and originated with our first number; but, until now, we have received no matter with which to fill it. This time, however, there have come to us three letters; and, as this is the department of the paper through which discussions and debates may be carried on publicly, and individual opinions be expressed, we hope that hereafter it will be, as it certainly ought to, a large and interesting part of our monthly.

Two of these letters, it will be seen, are on the same subject, and were brought out by an article in our last issue, entitled, "Examinations." The other takes the *INDICATOR* itself as the subject of criticism. We have already replied to this, to a certain extent, by stating that our want of a column of communications was only due to our having nothing to put in it; but would like to say further, that the writer must have drawn on his imagination when he supposed that any college papers are "read with interest by *thousands* in no way connected with those colleges."

'Tis true that a few friends of a college may read its paper; and we, no doubt, are able, at an institute like ours, to get out one which would be of interest to them, if we can only obtain the co-operation of students and professors, as well as alumni, as Mr. Pratt says. This, however, we have been unable to do as yet, and the work has fallen rather hard on

the editors, for they can hardly be expected to write editorials, poetry, athletic articles, amusing stories, scientific reviews, criticisms on our exchanges, and every other style, and make it good, besides looking after the publishing of the paper. Naturally, if we have more contributions there will be displayed more varied talent.

Mr. Pratt says, if all the work in preparing matter is left to the editors, it will be poor. We hope his idea was the same as expressed above, and not that the editors are incapable of fulfilling their positions. Then we would thank him for expressing his views publicly.

NOW, since the weather promises to be clear once in a while, we hope that the students will realize what a short time we have in which to prepare for the spring games. The weather has until now been a serious drawback to any field practice, and has, to a certain extent, retarded progress in any of the college athletics. A number of the students have been fortunate enough to secure a riding-hall for the purpose of practicing base-ball, and have made good use of the very short time allotted to us for practice.

Lacrosse has taken what seems to be a good start, although it is noticed that, as a usual thing, the same men are taking up this game that play at almost all the older established sports. It is to be hoped that the reverse will soon be the case, and men who have not taken a special liking to any one game as yet, but who have been content to look on, will be enticed to try this pleasant recreation and certainly beneficial exercise. Lawn tennis has not taken a start as yet, but a great many of our boys are anxiously waiting for the grounds to become a little drier, so that they may open the season and get in trim for the "tournament," which is expected to be held in the fall. It has been noticed that a number of the Sophs have been making racquets of their own peculiar pattern, and from which they expect great results—certainly the specimens that we have seen warrant their expectations. The

spring meeting will soon be in order, and all must prepare for some particular event. We certainly must not allow the affair to be a failure; we ought to make a fair showing at the Intercollegiate meeting in May. We *must* have *some* representatives there or lose our place. So, seeing what you have to do, you know how to prepare for it.

We would like to see more Freshmen in the field; there is certainly some good material in '87, and it must come out. A large majority of that class seem to have no thought of their college other than the fact that they have to recite in certain rooms and be here at certain days. If you are going to belong to a college, belong to it, be a part of it, and help to bring it to a place of prominence among our sister colleges. This you cannot do unless you are in a physical condition able to stand some wear and tear on your entire system. If you are going to attain this state of physical and mental perfection, give some of your time to physical culture here at Stevens among your own mates. You have to give your mental attention here; why not give your physical attention also, and join hands to bring about a good object. We want a gymnasium. Show the faculty and our outside friends that we have the material to fill it to advantage, and thus prove to them that it is the best present they can give the students of Stevens.

LANDED: A LEAP YEAR STORY.

BY A MINNESINGER,
Authoress of "New and Old."

PAST.

We went a fishing, I thought that Mabel
 Was barely able to catch a fly;
 She sat and watched me, at times commented,
 And was contented—and so was I.

The lazy water was cool, and bubbled,
 Though little troubled our craft to see;
 I gazed at Mabel with *some* attention,
 And, I may mention, *she* looked at me.

Some trout I landed. She said, "I'm ready,
 Pray lend me, Teddily, the hook and line."
 So I rebaited, and passed it over,
 And tried to cover her hand with mine.

The boat was drifting, her hook did wriggle,
 She gave a giggle, and lost her trout.
 She pulled her line up, but nothing followed,
 Her bait was swallowed, the hook flew out,

And high above her swayed, and sinking,
 Was soon a-linking its point to me;
 It caught my coat sleeve, I could not pull it
 From out the wool, it would not come free.

Then saucy Mabel was wild with laughter,
 A moment after she did deride.
 "I've caught a fish now, you can't deny, sir,
 It soon must die, sir, and then—he fried!"

I said most slowly, "Yes, you did hook me,
 Though you shan't cook me, and will not try;
 But you could kill me, as you'd discover,
 Just 'throw me over,' and then I'd die!"

Her face was sober. Another minute
 A glance grew in it, a sudden smile
 That crept and broadened; another giggle,
 "I'll let you wriggle—a little while."

But then, however, she thought, debated;
 I was elated; at last she spake.
 We glided farther, nor ever heeded
 The time that speeded, or fish, or lake.

PRESENT.

Now, I tell Mabel this tale to tease her,
 (I can't displease her, I should'n't dare)
 She for defense though, this plea does keep near,
 "Well, it was Leap Year, so it was fair."

COMMUNICATIONS.

Editors of the Indicator:

It is strange how differently some things are looked at by different persons, and what opposite conclusions they will draw from the same facts. I have never been more forcibly struck by this than upon reading a contribution which appeared under the head of "Examinations" in the last number of the INDICATOR.

The plan which Mr. H. A. Westminster advocates doubtless does well enough for primary school children, but college men are supposed to be something higher. Children require to have their lessons heard daily to keep them up to their work; but when a man goes to college he is old enough to appreciate his advantages, and should require no such stimulus. Every one knows how much valuable time is wasted in hearing lessons, which time could be so much more advantageously used for lectures.

I would like to see the petty system of holding recitations and marking abolished,

and for it substituted, at the end of the course, a rigid examination, continued over as long a period of time as may be necessary.

When under examination a man is required to concentrate his knowledge and depend upon what he knows. The ability to do this is just what he needs to meet the crises occurring every day in after life.

The system I have been advocating is, I believe, that pursued at the University of Virginia, and at the great institutions of learning abroad, and destined, Mr. Westminster to the contrary notwithstanding, to be generally adopted.

OLIVER SNOWDEN.

Editors of the Indicator :

As H. A. Westminster states in the last issue of the INDICATOR, examinations, as conducted, are injurious to the student, and might well be abandoned. But he is partly at fault in advocating that students should be graded entirely by their work during the term.

Every one with the least experience will admit that a subject is seldom learned until it is reviewed. In the pursuance of nearly all of the studies in either a collegiate or scientific course, with, perhaps, the exception of such branches as literature or history, but more especially in mathematics, the advance, particularly when rapidly made, is often but half learned, while probably more seldom understood. This is more noticeable in the case of dull students, who are slow to receive an impression, but equally slow to part with it, while the same is true in many cases with those who learn much more easily, but who can form no conception of the nature of the subject, for instance, as set forth in the next twenty pages, and fail to see in what manner that which they are at present learning is to be of value to them. In other words, they do not know exactly what they are driving at, and not until they have been to the other end can they see light through, or form a comprehensive conception of the subject. It is the review which fills up the gap, and tells how much the student has exerted himself. If he has been faithful during the advance, there will be nothing entirely new to him in the review, and he will see to what purpose the various parts are to be put ; while he will find that much which was originally difficult to grasp has become quite familiar to him through constant usage in later parts of the work. If by this time he has not become

familiar with the subject, it must be due to some individual reason, and he must suffer the consequences.

The writer, therefore, attaches all importance to the reviews, and considers that these should be conducted in a thorough and careful manner, and that upon these should the grading of a student chiefly depend.

SENIOR.

Editors of the Indicator :

The idea of founding a paper at Stevens was a praiseworthy one, and much credit is due those who were willing to undertake the difficult task. The INDICATOR is yet in its infancy ; it will improve and grow stronger with age, and now is the time to start it in the proper direction, for "as the twig is bent so the tree inclines." Already it has been noticed by several papers, such as the *Mechanics* and *American Machinist*, but, as one of them remarked, it is of interest principally to the students of Stevens. It is true that the INDICATOR is intended to be an exponent of the students, and is published for their benefit or pleasure. But any college paper that is devoid of interest to persons outside of the college for which it is printed, proves itself to be too narrow and local.

The papers of leading colleges of the country are read with interest by thousands in no way connected with those colleges.

Now, the question arises, how can the INDICATOR attain that enviable position ? The question is easily answered. Let a portion of the articles be on subjects of general interest, and not all on little incidents of the Institute and students. Now, it seems to me that Stevens has a much better opportunity for printing a paper that will soon be of wide reputation than most any other institution of learning. In the first place, Stevens ranks first in the country in mechanical engineering. Its standard is high. Now there are a number of men in the Institute who could write articles, not all necessarily on engineering topics, but good sound articles of interest to everybody. There are subjects of practical interest which attract the attention of some of us every day. New ideas and suggestions are constantly being made in the lecture-rooms and laboratories by both professors and students, and to give all the benefit of these, or at least to call their attention to them would undoubtedly be a help to all who read the paper.

The INDICATOR evidently has not received the support of the students that it should. This, of course, is in no way the fault of the editors; but it seems to me that the attention of the students should be called to the fact that if all the work in preparing matter for the paper is left to the editors, it will follow as a natural consequence that it will be poor. To succeed it must receive the co-operation of the students. And if the students would take the proper interest, it is quite possible that the members of the faculty would be kind enough to contribute from time to time, and the success of the INDICATOR would then be insured.

And, Messrs. Editors, as a constant reminder of the duties of all students interested in the welfare of the INDICATOR, I would respectfully suggest that the INDICATOR have a special department, entitled "Communications."

PRATT, '85.

TIME ROLLS ON.

BY SWIFT.

In childhood's days, bright happy days,
Too young to think of evil ways,
We sip sweet pleasures as they fly;
But childhood fleets so quickly by,
And time rolls on.

Youth follows childhood's sunny morn,
Of higher thoughts and feelings born,
Unfurls the world full to our gaze,
And bids us leap within its maze,
And time rolls on.

Now manhood follows on apace,
And in the struggle for the race
We meet the ups and downs of strife,
The victory or defeat of life,
And time rolls on.

And last upon this earthly stage,
Infirm and bent, behold Old Age!
With trembling steps he gains the door,
The curtain falls, life's dreams are o'er,
But time rolls on.

INSPECTION TOUR OF THE CLASS OF '84.

On Tuesday, March 11, the seniors accumulated at the Pennsylvania depot, Jersey City, to start on their second inspection tour. A special car was attached to the 8.45 a. m. train for their use, and when assembled here they numbered twenty-seven. Mr. Riesenger was with them, and two others of the class were picked up on the way. Arriving at Trenton, the special car was switched off, and

the class made their way, through not a little mud, to the works of the Trenton Iron Company.

Here was seen the complete process of the manufacture of iron wire, from the rude charcoal blooms to the hard finished wire of various gauges. The iron is first rolled to bar sizes or "billets," then reheated and passed back and forth between fast running rolls of smaller and smaller size, until it is reduced to three-fourths of an inch in diameter, the largest size they draw, or smaller. It is then annealed, washed in dilute sulphuric acid and dried in powdered lime, when it is ready to be drawn. This is done by pointing an end, passing it through a conical shaped hole (from the larger to the smaller side) in a block of steel, and attaching it to a windlass.

The whole process is quite interesting, and especially the rolling of the wire, when it wiggles about on the floor like a snake.

Another object of interest at these works was a Corliss engine. This was intended to run with a piston speed of about 350 feet per minute, and is not a "fast running" engine; but greater speed was required to drive the train at its proper velocity, and this engine was put in by Mr. Corliss rather reluctantly, against the advice of all builders of fast running engines. It has now been running for a long enough time to test its durability, at a piston speed of 1,100 feet per minute, and stands the wear and tear admirably.

Dinner was the next thing on the programme. This was had at the Trenton House, from where the class proceeded to the American Saw Company's Works. Here their attention was especially called to the different kinds of movable teeth for circular saws, and their ways of fastening.

The Glasgow Pottery was the next stopping place, and here the boys were shown the complete process of making crockery; the rough clay as it comes from the earth, the washing and separating of the same from all foreign substances, all the various ways of molding and turning it into the required shapes, the drying ovens, the baking and glazing furnaces, and finally, the decorating of the products, all of which was exceedingly interesting.

At 5.25 p. m. the class were again in their car and on their way to Philadelphia, where they arrived at 7 p. m. A few minutes' walk took them to the Lafayette Hotel, and here they put up for the rest of the week, enjoying a hearty dinner to begin with.

Prof. Denton arrived early Wednesday morning, and, dividing the class into two sections, and giving one under the guidance of Mr. Riesenberger, took the other to Morris & Tasker's and Southwark Foundry before dinner. The other section inspected the same place, but in a reverse order, so that only half of the class was at either place at one time.

In the afternoon, the works of W. Sellers & Co. and the Baldwin Locomotive Works were visited in the same manner, each party having a 'bus to carry them from place to place.

At Morris & Tasker's the students were shown the making of wrought iron steam pipes, the cutting, threading and testing of them, and the threading of nipples, elbows and tees. The welds in the smaller pipes are butt welds, made by simple contact, the iron being rolled up by drawing through conical shaped holes of smaller and smaller sizes. All the work is done very rapidly, the men being paid by the piece, and every contrivance used to save labor.

At Southwark Foundry the first thing to attract the students' attention was a large pit planer, in which the tool travels instead of the work. At these works were seen in process of construction the Clerk gas engine and Porter-Allen steam engine, and a description, in book form, of the latter, was kindly given to each student. In the foundry was noticed a very large steam travelling crane, which we believe is considered a failure.

On entering the works of W. Sellers & Co., the first impression made was that they packed their machines together like sardines in a box. Their systematic tool room was looked into and admired, after which the machines of special interest were examined. These were a twist-drill grinding machine, a horizontal drill and boring mill, a seventy-two inch lathe for the Calumet and Hecla mines, and an automatic gear cutter.

The Baldwin Locomotive Works, which were next visited, gave one an idea that system and order was of no importance in locomotive construction, for there was none apparent to a visitor, yet the students were told that they were turning out ten locomotives a week, and that their full capacity was two a day. However, when the drawing room, which was very kindly opened to inspection, and the gauge room were seen, this idea vanished. In the latter place are kept, in almost perfect condition, great numbers of gauges for all such parts of a locomotive as can be made standard

and interchangeable. The works, taken as a whole, seem like a young world.

Thursday morning the class went to the Midvale Steel Works, at Nicetown. Here was seen the manufacture of steel by the open hearth or Siemens-Martin process, with the use of gas fuel. A very interesting process was that of the making of driving wheel tires; the hammering of the bloom, or ingot, the punching, rehammering into rough form and final rolling.

Returning from the Midvale Works, the students stopped at the Harrison Boiler Works, where they saw the moulding, which is done entirely with green sand, grinding and testing of the units of that boiler, as well as a glass model of the Babcock & Wilcox boiler, showing, on a small scale, the circulation of the water.

In the afternoon the Schleicher, Schlumm & Co.'s Gas Engine Works were visited, where the Otto gas engines are built. Here one would notice immediately the exceptional cleanliness of the interior, as also the neat, fresh appearance of the exterior of the buildings, and that order and system reigned supreme. The Otto gas engine is used here exclusively for power.

In the evening Prof. Denton returned to Hoboken, leaving the class in charge of Messrs. Carr and Riesenberger, the former of whom joined the party at about that time. The following programme was then laid out for the two remaining days.

FRIDAY A. M.

J. Roach & Sons Chester.

FRIDAY P. M.

I. P. Morris & Co.'s Philadelphia.
Cramp & Son's "

SATURDAY A. M.

Edgemoor Iron Works Edgemoor.

SATURDAY P. M.

Pusey & Jones. Wilmington.
Harlan & Hollingsworth's "
J. Morton Poole. "

Owing to the very disagreeable and rainy weather Friday morning, and hopes of its clearing later, the proposed afternoon trip was taken in the morning, and *vice versa*.

A long and crowded street car ride took the boys to I. P. Morris & Co.'s. Here was being done considerable work for the Calumet and Hecla mines, among which were a new set of

valves for a Leavitt pumping engine, four hoisting drums each, 20 ft. 4 in. in diam., by 8 ft. 3 in. long, and which will carry each 4,000 ft. of 1½ in. wire rope, and heavy stamping machinery. Other things of interest were marine engines being built for Cramp & Sons, the light house for Mosquito Inlet, Florida, and one of the first steam engines ever built. This latter was a grass-hopper engine, built in 1804 by Oliver Evans, and is now running very smoothly, needing little repairs.

From I. P. Morris & Co.'s the boys went to the Cramp ship yards, where four or five ships were on the ways in process of construction. The machine shop was visited, where some heavy marine engines were seen in all stages of completion, and a student was forced to remark that the place was cramped. The mold loft was visited and the method of laying down ships was explained by the foreman.

In the afternoon, the ship yards at Chester were inspected, and here the method of putting a ship together was looked into, as there was one on the ways very nearly ready to launch. The monitor, Puritan, being launched and ready for her boilers and engines, was also in very good condition for inspection.

Saturday morning, the class left Philadelphia for Edgemoor and Wilmington. At the former place were visited the Edgemoor Iron Works, of W. Sellers & Co., bridge builders. A very noticeable feature of these works was the use of hydraulic pressure for forging, riveting, etc., as well as in hoisting-cranes. The Galloway boiler was seen in various stages of completion, this being the only work done here except bridge building and the like.

On arriving at Wilmington, the first works inspected were those of Pusey & Jones, which were engaged in building light draught steamers for the South American Republics, as also some general work, including paper machinery and the Clerk gas engine.

After this the boys had their dinner. Yes, and it was a dinner fit for a king, so that they had to go somewhere else for supper, fearing another such meal would unfit them for ordinary living.

In the afternoon the class went to Harlan & Hollingsworth's, where there were seen building yachts for W. W. Astor and Elbridge Gerry. A very noticeable feature was the arrangement of offices and drawing rooms. In the car shop, among many others, was a car for the President of the Argentine Republic, probably the most handsome one ever built. There was also being built a vessel for the

Cornell Line, having a screw propellor, which is to run between New York and Rondout.

The works of J. Morton Poole were the last to be visited, and here was seen the manufacture of paper and flour making machinery.

After supper there remained a short time before the arrival of our train, and this was spent very pleasantly by the boys at the depot, singing and fooling as only students know how.

The singing attracted a very large audience, and on leaving, the Stevens cheer was given from the car.

A COLLEGE PIN.

From the nature of our college and of the class of subjects taught here, the number of students we graduate is necessarily small. And, unlike the great universities, whose alumni form prosperous associations in all the cities of importance in the country, for the continuation of college fellowship and the introduction of the older to the more recent graduates, we have no way to become acquainted with those men who graduate after us, and so are liable to break up all of our old college associations. Would it not then be well for us to adopt the custom prevailing at the Columbia School of Mines and other scientific institutions of wearing a college pin or emblem, something that would indicate at once a member of "Old Stevens." Let it be something plain, but characteristic; not too expensive, so those of our men least favored by fortune may be able to wear one. Let it be of mechanical design, a gear or a pulley, for instance, and, like the School of Mines, crossed hammers to her men. We may have ever with us a remembrance of our college days.

HOW WE GET OUR MAIL.

"Did anybody ask you to bring that letter to me?" "No." "Well, why under the sun don't you let it alone where it belongs; here I've been running all over the building looking for that letter, which ought to have been left down stairs along with the rest of the mail. Of course I am very much obliged to you for your kindness in looking after my interest, but I'd rather you would let it alone altogether. Say, don't you go away mad. Well, if you will, go on."

"Now there goes that fellow just about as angry as he can be, just because I tell him that he ought to allow my letters to remain in the post office where I can always find them. I don't see what some fellows can be thinking of, to take all the trouble on themselves to collect another man's mail and then start to deliver it to him in some distant part of the college, when in all probability the owner is just coming to look and see if he is fortunate enough to get any letters. When he gets in the office some one says: 'There was a letter here for you, but so and so has it.' Then you start off to find the wretch, only to find that you are just missing each other—that you arrive in a room just in time to discover that he has gone out, he with an act of mistaken kindness and you with a strong desire to express your opinion of some meddling students." "Must I be my enemy's postman?"

COMMENCEMENT WEEK.

The committee appointed by the Class of '84 to arrange a programme for the exercises of Commencement Week, presented a report at a class meeting, Thursday, March 27. This was accepted by sections, as presented, and a synopsis is given below.

Sunday, June 8.—Baccalaureate Sermon at Trinity Church, Hoboken.

Tuesday, June 10.—Class Day Exercises at the Institute.

Wednesday, June 11.—Class Dinner.

The Class Day will be devoted to the regular Class Day Exercises, the following officers being elected by the Class:

Chairman and Toastmaster, E. B. RENWICK.

Historian, F. VAN VLECK.

Poet, E. H. FOSTER.

Prophet, WILLARD S. TUTTLE.

The Commencement will be held at the First M. E. Church, Hoboken.

C. F. PARKER was elected *Salutatorian*, and H. R. REA, *Valedictorian*.

FACULTY INDICATORS.

Look you! Who is it that is guilty of such a crime? A scrap of paper found its way into the editorial sanctum, and on it was written the following death warrant:

FACULTY INDICATORS.

Learning to preside with *more tone*.

An insight into physics becoming *mair* and *mair*.

A never-resting *thirst on* for knowledge.

A *versed sign* strongly posted on enduring *wood*.

Skill to *make orderly*, artistic drawings.

Taking the *leads* in chemistry and sanitary investigations.

A conversance with the recondite *se-cret* of language.

A *wall* filled with Belles-lettres.

Accurate and *confident on* mechanical work.

Mechanical drawing illustrated by a translated *giant mountaineer*.

The ocean traversed with the triumphal *car* of Stevens.

Following the electric currents under the wing of the *llama-geyer*.

WILL THE FUTURE SEE LADIES IN STEVENS?

Not long ago, while spending the evening at the house of a friend, a young lady asked me if Stevens was likely to follow the lead of other colleges and admit ladies. At first the question startled me, but I soon ceased to trouble myself about it, as a question too abstruse for a Freshman, and open to too much prejudice for a Senior.

About two weeks ago I had returned from the college, and after cramming tasks for the next day, retired to rest. I was much wearied in mind and body, and not on very good terms with myself, for I had flunked again in math.; and so for a time could not obtain the needed repose.

At last I fell into a deep sleep; a sound of hammers, the rasping of files, the roar of steam awoke me, and I found myself in what seemed to be a vast building with vaulted dome—this I judged from the sound of echoes—for it was dark, dark into very blackness. But how was this? I felt old, my days in college seemed ages in the past, and when out of the darkness came a sighing sound of words, and I at last distinguished, "Future days at Stevens," the words at first conveyed no sense to me, but after a time early recollections began to flood my mind, and as old things grew familiar again the black darkness began to lift, and soon I could see all about me. I was in a great workshop; far into the distance extended the rows of workers. But wait. Who are these at the great lathes, at the vise benches and the planing machines? Am

I deceived, or are they ladies? They must be, for no man at Stevens ever wore curls, and the costumes, too, are more tasty than of yore. "Yes," the ghostly whisper answers in my ear, "they are ladies." A fair form passes near me, and one of the workers at the bench addresses her as Professor, and I see from a badge displayed on her neck that she is an M. E. But where are the men—where are those overalls, those natty caps, those flannel shirts—are they gone? I wander to and fro in the hope of meeting a male student. The Freshman class is coming out of a lecture. I get into a corner of the hall and watch them. They are all ladies, every one of them. They make a pretty sight, I must admit, and they certainly do not jostle and push one another as the former Freshman were wont to do. The halls are filled with jaunty costumes, and among a crowd of others, a bloomer dress, beautiful to behold; a dress of bronze hue, coming to below the knees, and stockings of black; a cap of dull red completes this costume, and as the wearer turns away, I notice the word *Indicator* on the band of the little cap. Then, these are the present students of Stevens, and this crowd of charming girls in gowns of such delightful shades of colors, will soon be M. E.'s. My head reels and my brain grows dizzy, but I determine to make one more effort to obtain sight of a man in Stevens. I ask the way to the President's office of a little girl, who is dressed like an ancient page. Arriving at the office, which is at the end of a lofty marble wainscotted hall, I ring a bell by pulling a silken cord. I am admitted and find myself standing at the threshold of a beautiful room; hangings of mixed silk with rugs, which must have surely been made in the land of the white elephant, with rare pictures on the walls of oak, give an air of culture and refinement to the room which could not have been produced by man alone. As I make these observations, a lady rises with much dignity and comes toward me. Then in a low and sympathetic voice, asks me "who I wish to see?" I answer, "The President of Stevens College, should he be at liberty to see me." For a moment the silence is only broken by the distant throb of the engine, and then the lady, making an inclination of the head, informs me with a slightly annoyed appearance that the President is a lady and that she stands before me at my service. I murmur some excuse for my visit and retire, pass with a sorrowful heart along the wide halls and down the marble steps. As I leave the gate of the In-

stitute, I turn a longing glance backward and see a game of foot-ball on the green. They form more quickly, and I am at first tempted to believe that they must be the male students of Stevens; but a girlish burst of sweet laughter convinces me, and I turn away, my mind filled with the sights that I have just seen. I walk a few blocks, when meeting nobody but lady students in every variety of pretty costumes, I begin to feel faint. My head grows dizzy and I stumble, fall, and everything grows dark around me. While darkness is closing in upon me, the weird whisper is again on the air. Although almost unconscious, I am able to distinguish the words, "Reform, ye students of Stevens, reform; cease your throwings of chalk, your flunks, your carelessness in shop work, or your days are numbered, and the Stevens of the present shall pass away and be no more."

BOECUM.

PAST AND PRESENT.

It was a regular winter's day, although a very pleasant one; the air being bright and clear, bringing the rosy glow of health to the cheeks of the preps as they played the several boisterous and outdoor games known only to prepdom. All were not playing in the games; some of the older and larger ones were amusing themselves with snowballing the Stevens' students as they went to and from the college building; only those who have to run the gauntlet of about thirty preps, throwing snowballs with might and main, can tell what fun it is.

As we looked out of our window we used to see a large lot of ground which went under the familiar name of "Campus," and every fine afternoon might be seen a number of preps enjoying themselves—yes, enjoying themselves, even to the exclusion of the Stevens men, to whom we thought the first preference should be given; however, the preps always took possession of the ground, and often of the football, which, of course, belonged to Stevens; there used to be a small frame building right alongside of the high school, formerly an observatory; this and a pretty cottage occupying the N. E. corner of the block, together with the Institute, were all the buildings on the block. Now all is changed; as we look out of our window we see a handsome building about one hundred feet long and by about fifty wide; this building is re-

ally a great improvement to the general appearance of the block ; it looks as though the students and their friends had found out that they really needed something, and had gone to work with an earnest will and built it.

From the great improvement in the physical appearance and carriage of my student friends, I really think the new building must be a gymnasium, and certainly if the changed appearance is one of the effects of the gymnasium, I wonder why it was not thought of before. The students seem to appreciate it very much, for I notice a constant stream of them coming and going every afternoon. From my open window (for it is now Indian summer) I can see quick agile forms jumping and moving past the gymnasium windows like a panorama, every man doing something ; but what is that crowd collecting in one end of the spacious hall for ? Hark ! just keep still a moment ! What is that shout ? Listen ! Hurrah ! Hurrah ! Hurrah ! S-T-E-V-E-N-S. BLAKIE !

EM.

A NIGHT'S EXPERIENCE.

You ask for one of my experiences in my profession as a physician. Well, I'll tell you my latest. I was called at an early hour one morning last week in a great hurry. The messenger said I must come immediately, as they had delayed sending for a physician until the last moment, as is usual, and now feared that they had delayed too long. Of course I hurried ; and when we arrived at the house I found a young man apparently out of his mind ; he seemed to want to get out of his bed and go somewhere, as though he had but little time to get to his destination. His room mate had done his best to pacify him, but apparently to no purpose. "I must go," he said ; "I have but a few minutes left, and to be marked late is equivalent to a failure in his department. Oh ! how can I ever remember all this ? Say, Tom, what kind of shoes did Burns wear ? I think the book says, don't it ? It speaks of his shirt and collar anyhow, I am sure. Come, be quick, tell me did he have high or low shoes ? Hurry up or I shall forget. Oh, my head ! I wish some of these men had died before they were born. Oh, no ! I didn't mean that. See, here they come, all inimitable, all kings, everyone a despot come here to mock me. Are there no second rate fiends among them ? Yes, there is one, but what is all that commotion ? They are all try-

ing to kill that one poor unfortunate fiend, so that they may reign supreme, and have no fiends inferior to themselves in their kingdom. See ! they are coming this way, but what for ? Surely they can have no business with us, but they are coming nearer ; will no one help me ? What have I done to merit this punishment ? They have been beating me on the head for the past hour, each one taking his whack in turn, until my head aches terribly. These inimitable fiends are coming nearer ! I feel their hot breath scorching me with their passion. Help ! help !" Here my patient awoke, for he had simply been dreaming of his lesson in literature.

EM.

CRAMBO VERSES.

A few years ago a party of friends managed to get a good deal of amusement out of an exercise they called "crambo verses." Each one had assigned to him some subject on which to compose a poem, in the course of which he must rhyme some difficult word, which was also assigned. The word was generally so chosen that it was difficult to establish any relation between it and the subject of the verses. At the next meeting the verses were read and discussed. The result was generally a very pleasant evenings entertainment.

The following is a specimen. The word to be rhymed was "synchronism," and the subject

"IS LIFE WORTH LIVING?"

You ask : is it worth while to live ?
Well, that depends on whether you
Are cheerful or inclined to grieve,
And whether things look roseate or blue.
Sunshine or clouds, and rain or drouth
Make little odds ; nor age of moon ;
Nor if the Fates at birth put in your mouth
A wooden ladle or a silver spoon.
Let me a secret to the world impart ;
Devote yourself to optimism.
And then establish with some other heart
An ardent case of perfect synchronism.

INDICATOR CARD.

We would like to know for what purpose the new style of—well, the label on the box says crayon, was introduced into the mathematical room ? If it was to test the amount of wear and tear that a piece of diabolically compressed calcium carbonate, with an enormous overcharge of pulverized carbon, and

tempered so that it is warped into a helicoid, would stand, it has been a success, for it has been voted unanimously that it is almost impossible to detract from the original piece in hand even the slightest amount of its component parts, much less enough to make a mark on a plaster wall of an equal degree of hardness.

If it was to show the high moral status of the Sophomore class, in regard to profanity, it has dismally failed in its search, for, at any time during which the above mentioned, very much abused class had possession of the room, any man, who was not hopelessly deaf, might have heard innumerable quotations, which his instinct would teach him were not from the Bible or a hymn book. The best crayons that we ever used in this place came from the room in which languages are taught. If it is not asking too much, it would certainly be a great boon to many of us to make a change in this particular direction. EM.

STUFFING BOX.

Alden. Why is it thusly?

Wanted.—An ode on Spring—see fighting editor.

For High Tragedy—Method of *Limits* and such like, see '85.

College reopens Monday, April 21. Students, take notice.

Our next class of M. E.'s will graduate in the M. E. Church.

"Bone," "bust," "bilge"—"boot-lick," "gouge," graduate.

Senior talent ought to find its way into the INDICATOR; but it don't.

How did you get through, eh? Oh, excuse me, too bad. I'm sorry for you.

'86, brace up—fen throwing chalk, fen "collectin' in groups," fen everything.

Junior Ball—Where?

Entertainment—When?

Gymnasium?—Both.

Mysterious disappearance—a member of '86 left suddenly—no clue save the mournful tale of a lonely maiden, she got left.

A professor, previous to examination week, stated to the class: "Gentlemen, the next recitation will be an examination."

The class of '86 testified their approbation of the faculty's decision in the case of one of their number by a soul-stirring cheer.

The diligent student works hard and long
Before he concludes that

Rankine is wrong.

Stevens does take the cake for starting new schemes and ideas—a freshman has now undertaken the organization of a drum—"corpse."

Prof. Wood delivered the address at the Commencement exercises of the Hoboken High School on Wednesday evening, March 26.

The Preps. have had a raise—they rusticate now in the drawing rooms—the corners of the cases in the library having become slippery by too much usage.

An alumnus writes encouragingly to us, brightening our shattered hopes with the cheering news "that there is talent in the Board." Hoorah!

Spring sports and spring generally come at the same time; if Stevens doesn't do something shortly we will have to have the sports without the spring accompaniment.

A student has Nos. 2, 3, 7 and 9 of the *Eccentric*, which he will sell. Information concerning this and like notices may be obtained of C. R. Collins, '86.

In connection with the late dynamite conspiracies, we might mention, for the benefit of the authorities, that a Sophomore is going about with a razor in his boot.

The "bearded man" from '87, when not hungry, eats for his breakfast two bowls of oatmeal, some meat, two eggs, fifteen griddle-cakes, and drinks coffee to fill up on.

Trenton Porcelain Works—Senior—tripping upstairs—purpose unknown—after class have left—familarly to his departing classmates—a Tra, la, lu. Quick response from over head, "I see you."—Exit Senior (six steps at a time.)

Freshmen will please understand that it is the proper thing to remove their hats when in the drawing room, as well as when at a recitation or lecture. Some of them have actually been noticed talking to the professor with their hats on.

One of Hoboken's "Finest"—on the night of the candle factory fire—raising his helmet far enough above his eyes to see, soli-

loquized thusly: "Sure, thar must be some comboostable material over there or else it couldn't burn."

Something to take the place of embroidered hat bands, tennis caps, etc., is a neat order of hand bag for books. Get your best girl to make you one. Mr. Kletzsch is having one made—the design and general style can be noted after "she" has finished it.

Some of the patriotic citizens of Hoboken displayed the national flags of Germany and United States on the Kaiser's birthday—the American flag in one instance was hoisted upside down—probably done so in deference to Bismark and the pigmeat question.

A Sophomore when asked by a Professor when he could best spare time for some private work, carelessly suggested "anytime," and yet we complain of over-work. Consistency—where, oh, where; but never mind, we do have hard work and plenty of it, notwithstanding.

The class of '85 have presented to the library a copy of "Fresenius' Quantitative Analysis"—this will be a valuable addition, but it will occasion some inconvenience, as the next "Catalogue" of the library is *in* (great) *press*, but a little delay won't matter.

Owing to failure in getting railroad passes soon enough, the second trip of the Senior class, which was to commence Wednesday, March 5, and take in Trenton, Philadelphia, Chester and Wilmington, as stated in the February INDICATOR, was postponed from that date to Tuesday, March 11.

The "Stevens Lacrosse Team," though doing remarkably well as beginners, have not gained sufficient skill to engage in match games,—as yet. The other afternoon's work of the Team *vs.* Neighboring windows, was a complete walk-over for the latter, although they were badly broken up by the operation.

It is said that brass is one of the necessities in the make up of a successful editor. The INDICATOR Board will surely then always be a success, it takes about a pound and a half of brass to reach the editorial sanctum, in the shape of keys whose designs would compare well with the keys of some ancient county jail.

Some one says, the study of the German language is like unto the majestic flow of a great river—beautiful, melodious and powerful. We object to the beauty and melody, but

as to the power of the German lingo, we agree—for whether you jump into the river or attempt to study Deutsch, the end is inevitable.

Fearing the surplus in the Editorial Treasury will be small, and in view of the Annual "Toot" of the Board, which will begin shortly after Commencement, contributions can be handed to the business editor who also occupies the post of fighting editor. Those contributing may enjoy the privilege of having their names printed—if so desired.

The chalk in Prof. Wood's room is fast ruining the students. Three quarters of the hour is taken up in wishing that either the chalk or yourself were somewhere where blackboards are not used, and then the remaining quarter is too short notice for your neighbor to study your problem—so, you flunk—it is demoralizing—do let us have some good chalk.

Professor and Mrs. Leed's reception to the Sophomore class, on March 12, was an occasion thoroughly enjoyed by the class. They continued their revelries after the reception by escorting some of their number to the ferry; returning, they encouraged undue familiarity with the Hoboken "peeler," and came near being called to attend another sort of reception.

Advices from trustworthy sources state the favorable progress of negotiations between the U. S. Government and the H. L. & I. Co., for the purchase of two of the company's waterproof fleet, for war purposes. It is supposed they are to be loaned to the English, to further British interest among the followers of the False Prophet. The two boats which are to be sold, known to us as the "James Rumsey" and "Weehawken," will, in addition to an extra coat of paint, for protection against the "slings and arrows" of the barbarians, be christened anew as the "Speedwell" and "Thunderer," respectively—their mission is to float (if able) about Egypt, and astonish the natives into submission.

On March 10 our Glee Club showed what progress they have been making by giving a public rehearsal in Prof. Wall's room. It might be said for the enlightenment of some of our Alumni, that this room has been somewhat enlarged since they used to occupy it, yet it was almost completely filled with students and professors, so great was the interest taken in the singers, and all present seemed to enjoy the music heartily. The Glee Club

must indeed be commended for their success, and, above all, our praise and thanks are due to Brainard, '84, their leader, who has pushed this matter ahead, even from his Freshman year. Besides training the boys in their several parts, he sings either tenor part, as is necessary, and also yodels. This he does very well, and the two pieces in which he favored us were both encored. The other members also take their parts well. They are :

<i>First Tenors</i>	{ Cotiart, '86
	{ McElroy, '87
<i>Second Tenors</i>	{ Mitchell, '84
	{ Morton, '86
<i>First Basses</i>	{ Thomas, '84
	{ Bushorn, '85
<i>Second Basses</i>	{ Bristol, '84
	{ McLean, '85

The programme consisted of a dozen well chosen pieces.

If there is any student who would like to join our Glee Club, he would do well to notify Brainard, '84, of the fact, for the latter is looking for more singers.

PERSONALS.

'76.

WILLIAM DIEHL is Demonstrator with Dental Clinic of the University of Pennsylvania.

'77.

FRANKLIN VAN WINKLE has patented a new form of transmitting dynamometer, which will be manufactured by the Edson Recording Gauge Co., Liberty street, New York, with which he is connected.

'78.

O. C. GSANTNER, Cadet Engineer, U. S. N., is now on a two years' cruise on the U. S. S. "Alliance" of the North Atlantic squadron.

EDWARD P. THOMPSON, of Elizabeth, N. J., has, in connection with a Mr. Stanly, invented an incandescent electric light of improved form, which will be manufactured by the Union Switch & Signal Co., of Pittsburgh, Pa. The principal advantage claimed is simplicity and cheapness of manufacture, and one of the chief peculiarities is using animal instead of vegetable fiber to obtain the carbon.

JOHN STEPHENS, with the Oregon Railway and Navigation Co., called at the Institute during a brief visit home.

'81.

M. J. MARTINEZ is with the Babcock & Wilcox Co., 31 Cortland street, New York.

FRED. ROSENBERG is Assistant Supervisor of Permanent Way on the Pennsylvania R. R., with headquarters at Gallitzin, Pa.

F. H. WILLIAMS is vice-president to Williams, White & Co., manufacturers of machinery, Moline, Ill.

'83.

J. E. SAGUE is with E. D. Leavitt, Jr., of Cambridgeport, Mass.

H. A. HICKOK is with the Wallis Iron Works, Jersey City, N. J.

E. DUQUE ESTRADA is with the Engineer Corps, of the Juragua Mining Co., Santiago, Cuba.

M. MCNAUGHTON is assistant to A. C. Humphreys, '81, Engineer of the Pintsch Lighting Co., New York.

E. N. WRIGHT can be addressed, care von der Becke & Marsily, Antwerp, Belgium.

J. B. ADGER is manager and treasurer of the Charleston Iron Works, Charleston, S. C.

M. BROOKS is very ill with typhoid-fever at his home in Boston.

L. C. DAWES is on the editorial staff of the *Iron Age*, New York.

F. K. IRWIN is with the American Ship Building Co., Philadelphia.

H. M. PLAISTED is connected with the Webster Milling Machinery Co., Detroit, Mich., and is now engaged in the erection of a mill at Amherstburg, Ontario, Canada. The last address will be good until May 15.

H. P. ROPES is at the Northern Pacific R. R. Shops, Brainard, Minn.

J. E. STEWARD is connected with the shops of the Chicago, St. Louis and Pittsburgh Division of Pennsylvania R. R., Logansport, Ind.

FRED. TAYLOR is chemist to the Midvale Steel Works, Nicetown, Philadelphia, Pa.

L. S. RANDOLPH is Engineer of Tests to the New York, Lake Erie and Western R. R., Susquehanna, Pa.

EXCHANGES.

The Exchange Editor has the pleasure of making the acquaintance of many new journals, and prominent among them in fancy dress is the *Polytechnic*. The frontispiece, with its array of instruments and apparatus, strikes joy to the heart of the editor; it looks homelike.

The paper will rank with the very best of our exchanges. None have we seen containing so much interesting matter and so much common sense. From one cover to another there is scarcely anything which will not interest the general reader. The sentiments expressed in the article on Sunday amusements we heartily endorse. It might be a very desirable state of affairs when a workingman would come home after a week's work and sit down and read the catechism all day Sunday; but unfortunately we have to take human nature as it is, and the man who labors all the week is going to have some recreation; and, as the *Polytechnic* says, if it cannot be innocent enjoyment, such as is afforded by our reading-rooms, art galleries and museums, it will, in too many cases, be the gin mill. Article number two of "Yarns by the Sporting Editor," is a very interesting story, and is very well written, with the exception of a few expressions which have a rather stiff, stereotyped form. The poem on Wendell Phillips is a well finished and a feeling tribute. It seems rather hard that anyone, after having been helped over the examination chasm by the crib plank, should pull it from under the feet of the luckless ones coming after, as is done by the author of "Cribs," an *exposé* of the various dodges resorted to to get through examinations. We are afraid that the author will not win the warm approbation of his fellow students, although he may earn the gratitude of the professors. If the "*Poly*" exchanges with its sister institution, the Adelphi Academy, we would recommend to them in the last month's journal of the latter institution an article on adjectives. It is rather hard on the hoary, venerable old Coliseum to inflict on it the airy adjective "elegant."

The *Bowdoin Orient* is largely devoted to matters of local interest, but contains some articles for the general reader, among which is a very sensible paper on the political duties of educated men. To every thinking person it is evident that the neglect with which political questions are treated by our more intelligent people cannot be without an evil effect.

As the *Orient* reminds the reader, political affairs, if neglected by those who are competent and upright, will be diligently looked after by those who are ignorant and evil-dispositioned, and it is the place of the voter to realize this and look out for his own interests. He must abide by laws, and is worse than a fool if he does not look after their making. The expanse of prose in the magazine is broken by a pleasing little poem, "At Eventide." The remaining matter is well gotten up, and the magazine generally is a success.

We envy the students of the Massachusetts Institute of Technology their good fortune, of which we are informed in the first editorial of the *Tech.*, that of receiving instruction in Political Economy. To our mind no branch of instruction is of more importance than this, and, as is presented by the *Tech.*, when political questions of such weight are to be decided, such instruction is doubly interesting and of the greatest value. The present number of the magazine is by no means surfeited with long articles, nor are those contained of the most interesting nature, but still there is considerable good matter. One very good feature is a statement of prominent articles in leading journals and magazines of the day, giving the reader a fair idea of the leading literature from which any of especial interest may be selected.

The single story in the *College Argus* looks rather lonely sandwiched in between a formidable array of editorials on one hand and miscellaneous articles on the other, protected only by the heralding poem of two verses and the appendage, "A Would-be College Tough." We admire the distribution of matter, however, the story with its weighty subject being arranged as a climax; the reader is lifted gently out of the editorials by the poem, and as gently lowered by the "Tough" into the miscellany. Spruce up next time, *Argus*. Take a dose of licorice water and see if you cannot get a little more filling in the sandwich. A very good thing is the selection of poems from their exchanges. Only on seeing them all together can one realize what a prodigious amount of talent is wasting itself, "not on the desert air," but on the college journal.

The *Chronicle*, of the University of Michigan, appears in a dress which is original, and in general very pleasing. The only point to be criticised is the coloring, the combination

appearing rather weak. Might not that straw color be changed for some deeper shade or some other color? With regard to contents, these are voluminous and of very fair quality. We like the tone of the editorial on base-ball, although sorry that any such opinion must be expressed of the amateur associations of that part of the country. We admire the good grace with which the writer accepts the position of the students in athletic matters and the disposition manifested to aid in promoting home excellence, and hope that the students may soon be able to place themselves in the very foremost rank. The "Locals" are very full—all departments of the university being well represented.

In the *University Magazine* there is a quantity of editorial and miscellaneous matter, but not much general reading. The chief feature in this line is a rather indigestible story of a murderer being turned aside from his bloody purpose by the sight of the badge of the college fraternity to which he belongs, on his intended victim's vest; the moral evidently is to join some college society. This impressive little anecdote nearly had its effect on the exchange editor, who, although only a college editor, clings to life, and he almost resolved to seek admission to some society. On second thought, however, it occurred to him that although joining would render him a little more safe from being murdered by his own society, still in the eyes of rival ones his scalp would be of infinitely increased value, and this consideration altered his determination. The remaining contents are fair, although the insertion of a little more general matter, jokes, clippings, etc., would be a decided improvement.

The *University Courier*, of Kansas University, favorably impresses one upon a hasty glance, and the good impression is not lost on a closer examination of the contents. The March number opens with two excellent articles, good in thought and expression, the first under the heading, "Our National Paradox—Legalized Lawlessness," and the second on "Constructive Genius." The former article is a presentation and consideration of the dangers to our government from an excess of liberty, constituting, in the language of the writer, "legalized lawlessness." The remedy proposed by the writer for the danger which is incurred in giving to ignorant persons the right to vote, is to make education the necessary qualification. This would be seemingly an excellent thing, but there is unfortunately

no likelihood of its becoming a law, and in view of this unlikelihood, since every man must have a vote, the best thing to do is to enforce the law for the compulsory education of children, to make men competent to exercise their right.

Our scientific and engineering exchanges given below are, as usual, full of valuable matter. Owing to lack of time, we are unable to review them as they should be, but in our next issue and thereafter their leading articles will be announced, and, as far as practicable, reviewed.

We acknowledge the receipt of the following journals: *Concordensis*, *Amherst Student*, *Adelphian*, *University Magazine*, *Oberlin Review*, *De Pauw Monthly*, *North Western*, *Madisonensis*, *Queens College Journal*; and of scientific journals: *Electrical Review*, *Mechanics* and *American Machinist*.

CLIPPINGS.

A paper published in Amherst College has the following incident: "He was a senior, and as he fetched up at the bottom of those slippery steps, he ejaculated: 'Hell (just then a professor came gliding around the corner) is paved with good resolutions.'" The professor smiled blandly, went to his room, and gave that student ten.—*Ex.*

Snodd's coffee pot boiled over and burned his hand the other day, and now he is getting himself generally disliked by telling people he was hurt by the eruption of Java.—*Lampoon.*

Stable keeper—"By the way, shall I put in an extra buffalo?" English blood—"Couldn't you let me 'ave an 'orse, you know. Er—er—rather not drive a buffalo first time, you know."—*Ex.*

The latest slander on the dude is, that one bumped his head against a cobweb stretched across the street, and had to be carried home with a cracked skull.—*The Hoosier.*

When the enterprising butcher's assistant "set up on his own hook," did he find a comfortable seat?—*Puck.*

"Boil down this stuff about forests," said the managing editor, handing a bundle of manuscript to a reporter. A few seconds later the editor received the following: "The way to preserve our forests—don't cut them down."—*Ex.*

A masquerade
A sophomore,
A dizzy female "dancer ;"
His heart is struck,
She hits the cord,
Throughout the eve he haunts her.

'Tis two o'clock,
All masks are raised,
She draws hers off with vigor ;
He's paralyzed,
Dumbfounded, dazed,
When he beholds a—nigger. —Ex.

Prevailing colors—Green (before examinations) and blue (after).—*The Adelpian*.

Oscar Wilde asserts that his poetry will be read when Shakespeare is forgotten. Possibly, but not before,—*Philadelphia Chronicle*.

A boy, a girl,
A wavy curl
Blown out by the wanton wind ;
A waist, an arm,
Sure what's the harm
If arm about the waist were twined ?
A blush, a kiss,
One more I wish.
The father toward them gently stole—
A scream, a shout,
A foot let out,
The impress left of his boot sole.

—*Kenyon Advance*.

THE COLLEGE WORLD.

AMHERST.—Seventy members of the Massachusetts Legislature made their annual visit to Amherst recently.—Spelling reform is needed at Amherst ; at a recent lecture a student was directed by the writing on his ticket to the "Galerry."—The Faculty of Amherst has declined to take any action whatever in reference to the "Regulations for Inter-Collegiate Athletic Sports."—Amherst has raised \$120 for the workman who was recently severely injured by falling from a scaffold while working on the new college gymnasium.

COLUMBIA.—Harvard has accepted the challenge for an eight-oared race.—Pneumatic rowing-machines have been placed in the gymnasium.—An effort by the Columbia freshmen to fine absentees from class-meetings, has proved unsuccessful.—The *Columbiad* has made its appearance.—A banjo club has been formed at Columbia.—The class of '86 at Columbia is in debt to the extent of

\$635.15.—The Law School contains twenty-one graduates of Princeton, twenty-two of Harvard, twenty-five of Yale and forty-nine of Columbia.—A new sidereal clock has just been mounted in the observatory.—Columbia is next to the University of Texas in wealth. Her endowment now amounts to \$5,000,000. She was organized in 1856, and the original endowment raised by lottery. It is expected that she will have 2,000 students next fall.

HARVARD.—Harvard proposes changing its four years' course to three.—The President's salary is to be increased by the interest on \$60,000, raised for that purpose.—Harvard received \$173,000 last year from term dues alone.—The vote of the Faculty on the athletic resolutions was twenty-three to five in favor of them. The students are nearly unanimous against this action of the Faculty. A petition has been circulated and extensively signed, and other measures have been taken to induce the Faculty to rescind their action in the matter.

YALE.—Knee breeches will be worn at the senior promenade.—Yale and Princeton are about the same in reference to the entrance requirements.—Yale is to have an illustrated paper.—Prof. Wheeler recently stated at a college dinner that, twenty-five years ago, the average Yale student was a long-haired individual, wrapped in a blanket shawl.

GENERAL.—At a meeting of the Society of Arts of the Massachusetts Institute of Technology, March 13, Mr. Delany, of New York, exhibited in operation his new system of synchronous multiplex telegraphy.—The University of Pennsylvania has 1,044 students.—The Lehigh University is to have a glee club.—A base ball nine has been formed by the young lady students at Hallowell Classical Seminary, Maine.—Lehigh has applied for admission to the Inter-Collegiate Lawn Tennis Association.—Oxford University has decided to grant to women the same examination for admission as is accorded to men.—A number of Dartmouth Juniors have been suspended for dishonesty in examinations.—William and Mary College, of Virginia, has been closed. This college was chartered in 1693, and is but a few years younger than Harvard.—The United States has 190 college papers.—Miss Alice Freeman, President at Wellesley, is a Doctor of Philosophy.

THE STEVENS INDICATOR.

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It is particularly desired that Alumni furnish us with all items of interest concerning themselves and every one who has been connected with the Institute.

It is expected that all articles shall be written in a courteous tone.

The writer's full name, as well as his NOM DE PLUME, must accompany the article, as assurance of good faith and reliability; but it will not be published, unless desired.

The editors do not necessarily endorse sentiments expressed except in the editorial and exchange columns.

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WE must again call to the students' attention that the time for preparing for the inter-collegiate games is very short, and that we *must* be represented in *this* year's games or lose our place in the association. Brace up! We cannot afford to rest on the laurels which the foot ball team won for Stevens last fall, but must keep at it, and not fall behind in base ball, the recognized spring game. There is one thing certain, and that is, the team *must* play together as a team, and not split up, as the foot ball team was often compelled to do, for want of enough men to make an opposing side. Let the whole college play against the picked nine and compel them to work individually, each for his place on the team.

It ought to be understood that the nine is subject to change in case any man commences to lag behind or a better one comes to the front, thus giving all a chance to get a place on the team.

In regard to the proposed spring games, we must push forward and get the thing in proper shape very soon, or we will get left, by reason of not having contestants in trim for the meeting of May 24, at which it is to be hoped Stevens will come to the front in such a manner as to surprise even ourselves. We cannot impress too strongly on the minds of the students the importance of having representatives at this meeting.

It has been decided by those in charge to hold our own spring games on the 17th of May, and as it is from this meeting that we expect the best men to come to the front, it is to be hoped that all who can will take advantage of this opportunity to enter for the game at which they think they have the best chance or are best fitted for, whether it be running,

jumping or anything else. We have spoken to a number, and have tried to persuade the doubtful ones to enter for some of the events, but with small success, the universal excuse being "I have not time." We fail to see how a moderate degree of exercise can be instrumental in lowering any man's standard in his college work. It is a well known fact that some exercise is absolutely necessary to keep the body in a condition able to stand successfully the mental strain which is put upon us here at Stevens; and if, instead of scattering his efforts at muscular development, the student will only combine them and direct his attention to a very few things, he will not spend any more of his time than he used to do before, and soon will become proficient in the few games to which he has given his attention, and able, no doubt, to assist in holding up the record of Stevens in the field when she has occasion to meet other colleges in friendly athletic encounters.

WE would like to see more interest taken in the INDICATOR by the Seniors. It is surprising to us that men who have had such experience as they are supposed to have about college affairs should be so reticent and bashful about putting their shoulders to the wheel and helping to push forward what is universally acknowledged to be a good thing. When the above mentioned class have graduated and taken the various positions in life which Dame Fortune has assigned to them, they will be held accountable for all statements which appear in print over their names. Why not school yourselves now in the art of being able to write a clear and comprehensive account of an experiment or occurrence at a time when you will not be held to such a strict account for any mistake you may make in your statements? The Seniors, in their varied experience, must certainly know of some incidents which would be likely to interest their fellow students. Why not give us the benefit of your experience? You are reaping the benefit of other men's experience all the time,

and the least you can do is to lessen the debt—even if it be only by a small amount—which you owe to those who have gone before you, by doing what you can to lighten the labors of those who have to follow in your wake. The most of the work contributed to the INDICATOR has been given by the lower classes, the upper classes contributing almost nothing, except, indeed, considerable amounts of advice of what ought to be done. The general excuse is, "I have not time." Well, if the Seniors have not time to do a little work for the benefit of the college and themselves, please inform us what we are to expect of the Sophs and Freshmen? And yet almost all the work outside of the Board is done by these very same Sophs and Freshmen. Poor excuse, Seniors; you will have to try something else, or rather reform altogether and help to make the college publication as interesting as possible. We are unwilling to believe that it is not in you.

THE students of the institute may consider themselves fortunate and well favored in having a Faculty whose rulings are characterized by justness and an evident desire to make institute life as agreeable as is consistent with earnest work and the amount of study which the catalogue calls for.

One of the chief features is the apparent plan to lend aid to a student so long as he gives evidence of a desire to improve; but immediate withdrawal of favor and quick dismissal, when in their minds a student has a great liking for the pleasures of life with too little regard for the duties. And we still note with pleasure the more than friendly intercourse which exists between the members of the Faculty and the students; but there is one rule, established a year ago, that seems not only unnecessary, but severely unjust to the student, let him be good or bad, and which causes considerable trouble. We have reference to the rule prohibiting a student from attending shop or experimental work in

the preliminary terms, if conditioned in any study at the June examinations.

A moment's consideration will not fail to show the infinite amount of harm and the least possible good that can come from such a course. One of our professors has on several occasions asked students if they feel that they will ever amount to anything sufficient to reflect credit on the institute, and the catalogue impresses one with the idea that a graduate from Stevens must necessarily be a man of some worth. Now, if this is all to be, how is it to be accomplished? Is it by the student's effort alone, or is the Faculty responsible for the results of the four years' training? Each depends on the other, and so by the encouragement of the one and the earnestness of the other, the course is completed with satisfaction to both. Now, such has always been the case until lately, and we do not hesitate to say that when a student is prohibited from attending the Preliminary Term, when it is known it is his intention to continue in the college, a vast deal of harm is done for which there seems no excuse.

The time for examinations for entrance and the making up of conditions is in the latter part of September, after the Preliminary Term is over, and a student, no matter how much he may desire to work, has to remain idle until then before he again becomes a *student of the institute*. Our Institute prides itself on its course of practical work, and offers this as a recommendation for its graduates as having the advantage over graduates from other engineering schools, and why, then, should a rule be made to prevent a student from enjoying this privilege?

It appears to our mind that this rule has been made heedlessly, without considering the irrecoverable loss which both student and institute suffer. The matter could be best remedied by abolishing this regulation entirely, or by giving opportunity for the passing of conditions previous to the Preliminary Terms. We think this subject of sufficient importance to merit its consideration by the Faculty, and we recommend that some change be made.

THE IMPORTANCE OF GOOD READING.

In this course of ours, at Stevens, which is so strictly utilitarian, we are too apt to neglect that part of a broad education without which we would not be fitted to take the position in social life in which our ability as engineers should some day place us.

The part of education here referred to is that acquired, and only acquired, by a familiarity with the leading poets, essayists and historians.

"Here," as Bacon says, "are the finest minds giving us the best wisdom of present and all past ages; here are intellects gifted far beyond ours, ready to give us the results of life-times of patient thought; imaginations open to the beauty of the universe, far beyond what is given us to behold; characters whom we can only vainly hope to imitate, but whom it is one of our highest privileges of life to know."

Mathematics, Physics and Chemistry all educate the mind, and fit us for the battles of life, but they do not afford the culture, nor mould the disposition and character, as do the classics, and in following these too closely, we are apt to become too practical and material, and forget that there are things even more profound and grander than these. This probably accounts for the fact that so many scientists are materialists.

The heart, "the seat of affections and sensibilities," needs education and culture as well as the mind. The growing tendency of our age is toward things strictly practical; and while this is undoubtedly one of the most important directions of growth of the human mind, it is among the possibilities that it may be carried too far and at the expense of other essential branches of learning.

But a study of the classics, besides affording culture, has an eminently practical value. It enables us to express our ideas clearly and concisely. Too often do we meet with persons liberally educated, from a practical point of view, but who, having so neglected the classics, are scarcely able to frame a sentence or express a thought without hesitation or repetition.

In a course like ours, where there is so much learned in so short a time, there is little or no opportunity to pursue a regular course of reading outside of the prescribed studies; but there are times with us all, as vacations, for instance, when studies are laid aside and,

wishing a relaxation from regular duties, we take up some lighter reading.

These are the golden opportunities to combine pleasure with something that will be of lasting benefit.

C. A. P.

OUR BODIES.

Mr. William Blaikie, in a recent article on "Our Bodies," deplors the lack of thorough physical training throughout the schools and colleges of our country. The general athletics, and the sports which occupy so many of the students of the colleges, are engaged in by those who least need them. The amount of strength required to compete in any of the ordinary sports is far above that possessed by the average young man. In reply to the statement that some may benefit by manual labor, he says: "Not one in fifty of our school boys and girls does a day's manual labor in the whole year round; indeed, the majority of them never did one in their lives. They grow, but they do not develop. It has been argued that the system of athletics generally pursued makes those who practice it essentially prize fighters, champion oarsmen, 'wasting their time and devoting all their thoughts to some feat of athletic prowess.'" In rebuttal of this statement, Mr. Blaikie instances President Eliot and Professor Agassiz, of Harvard, and Dr. McCosh and Mr. Gladstone. "Yet the former two did excellent work in their university boat. Princeton's famous president, if our information is correct, rowed in the Dublin university crew, and the British prime minister can now, at seventy-three, probably cut down more trees in a day than any merchant, banker, or professional man of his age in the City of New York, and yet finds time to grapple with the most intricate and difficult problems of a territory twice as vast as the whole United States."

Continuing the argument, the writer says: "The results of this utter neglect of any sound system of physical education stand out in almost every city home in America. Not one boy in five is well built, or, unless he is fat, measures within an inch, often three inches, as much about the chest or thigh or upper arm, or weighs within ten pounds as much, as a well proportioned, vigorous, properly developed boy of his age should do."

"Scarcely one girl in three ventures to wear a jersey, mainly because she knows too well

that this tell-tale jacket only becomes a good figure. Yet the difference in girth between the developed arm which graces a jersey and the undeveloped one which does not, in a girl of the same height and age, is seldom more than two inches, and often, even, than one, while the well set chest outgirths the indifferent one by seldom over three inches. Among girls, running is a lost art. Yet it is doubtful if an exercise was ever devised which does more to beget grace and ease of movement.

"Most girls have weak arms. If they doubt it, let them try with one hand to push up once high over their head a dumb-bell weighing a quarter or even a fifth of their own weight. Or with both hands catching hold of a bar or the rung of a ladder, as high up as they can reach, let them see if they can pull slowly up till the chin touches the hands. Yet a moderately strong man at dumb-bells will push up one weighing over half his own weight, and some men have managed to put up more than their own weight; and as to pulling up, a girl with developed arms can do it five or six times with comparative ease, and a boy with thoroughly good arms two or three times as many. Both the forearms and the upper arms of most girls are not so large by an inch as those of well built girls of their height and age. Yet in any well regulated gymnasium we find youths adding in one year an inch, and even two inches, to the girth of each upper arm, and half as much to that of each forearm, while a gain of from three to five inches about the chest is nothing rare, and all this simply by less than an hour's daily work, yet which, besides expanding the lungs, called the various muscles of the arms, shoulders, chest, and all the greater parts of the body into vigorous play."

Professor Farrow, at West Point; Professor Andrews, of the Gymnasium of the Young Men's Christian Association at Brooklyn; Dr. Sargent, of Hemenway Gymnasium at Harvard University, and Archibald MacLaren, of the Gymnasium at Oxford University in England, all find no difficulty in adding in one year from an inch to an inch and one-half to the fore and upper arms, and three inches to the girth of chest, of pupils under their charge.

A DREAM.

Speaking of dreams, I had the worst one last night I ever had. You know that lead-colored house back of the High School? Well,

it was all about that. I had been trying to find out what it contained, but could not ; and I dreamt that I was sitting at the end of one of the tables in the library, reading over the library catalogue, when two men, dressed in white, came up to me and requested that I step around the corner of the college a moment. Just as we arrived at the little lead-colored house, they both laid hold of me and forced me in through the door. Well, to say I was surprised at what I saw, don't express it at all ; I was simply dumbfounded.

There were workmen all over the place, which had all at once grown to thousands of times its size, as viewed from the uninitiated outside. In one corner was a man making an analysis of the moon ; and thinking that he would be an interesting subject to question, I commenced. What was he doing ? Well, he had been instructed by the king to see what the moon needed to make it warm, and after he had found out, he was to send to the supply office for the necessary material ; he said he expected to have it all done in a few thousand years. I asked him if he did not think it a long while. "Oh, no," said he, "my friend over there has been working on a plan for the equal distribution of wealth and health for a much longer time than that, and he does not expect to get done for quite some time." In another part of the room was a pretty little engine with no visible means of power. Thinking this might be something new, I went over to the man who had it in charge and inquired what it was. "That," said he, "is a perpetual motion machine ; why, it's as old as the hills"—noticing my surprise—"we have had that thing in here for a long time. We used to have a ball that rolled up hill, but it got away one day and we have not seen it since. Funny ; don't you think so ?"

With this remark he went back to his work of pumping sunlight into a new kind of motor. In a more remote part of the room was a man trying to pick up threads and pins from the carpeted floor ; what was he doing ? Well, he was straightening things up a bit. There had been a dressmaker here for a few hundred years, preparing dresses for Venus' reception, and he had been picking up scraps and pins ever since ; he thought he might get through in time to be on hand when the new cupola was to be dedicated. Further down the room was a railing, enclosing about a dozen men who appeared to have nothing in particular to do ; but, on inquiry, I found that they were a supply of referees for the various

college games, men with whom *no* fault could be found by *either* side, and they were here to lend their moral influence. So far, this was the only factor in this truly wonderful building that seemed familiar. There were so many wonderful articles in the place that it was impossible to see them in one visit. However, I went down the stairs into what seemed to be the forge shops, and, seeing some men at work on a long piece of steel, miles in length, I asked the man in charge what it was for. "Humph," said he, "young man, do you suppose the axis of this earth is going to last forever ; you don't know, eh ? Well, I'll tell you ; it is not, and this piece of steel is to take the place of the present axis, which has been in use for some time ; you think it is a little short, do you ?" This I could not tell, as I was unable to see the other end, but presumed so. "Well, you are right ; it is a great deal too short ; but after we magnetize it, it will be long enough, I warrant you. We are going to make it hollow, so that we can establish an express line inside, to supply food, etc., to arctic explorers, when they get to the North Pole." "Will they ever get there ?" I asked. "Oh, yes ; we are making a new machine for thawing ice especially for that purpose ; it will be done in a few centuries. Besides, you see that machine over in the corner ? Well, that is a new magnetic motor. It has a magnet in the centre, and when we start it, it will go straight up to the North Pole." Just at this moment one of the workmen hit me on the head with a piece of hot steel, and I awoke and found myself all in a heap on the floor, having rolled out of bed, striking my head on the corner of my trunk. EM.

MY EXPERIENCE.

I suppose you have all been up to the roller skating rink. I was up there the other night. My girl asked me to take her with me, but I thought I wouldn't, as I remembered the disastrous experience I had the last time I took her there. That was when the American Institute Fair was being held. Of course, as soon as we got inside the door I made a bee-line for the machinery, and when we got there, tried to explain to her something about an engine. I shall never attempt such a thing again, and I advise you not to do it, even once.

"You see," said I, "this machine——"

"What machine ?" she interrupted ; "where's the machine ?"

"Why, here," I replied.

"But you can't sew with that, can you?" she asked.

"Sew with it?" I said; "sew with that thing? Why, that's a fifty horse power steam engine."

"But I thought that machines were to sew with?" she answered.

"Well, that's a different kind of machine; there's more than one kind. Rankine defines a machine as something made to produce motion against resistance."

"Why, how funny."

"What's funny?"

"Why, the resistance."

"Well, I don't see anything particularly funny about the resistance. What's funny about it?"

"Oh, no, no; I didn't mean the resistance; I meant Rankine."

"Oh, yes! Rankine is funny—very funny. He is about the most amusing author I have ever read. Why, our class used to read his books all the time. In fact, they got so interested in his witty remarks that they used to miss all their other lessons."

"I should like to read his works ever so much. What makes that engine go?"

"Steam."

"Why, isn't that queer! Would a tea kettle run if it was put on wheels?"

"Well, I don't know. I've heard of tea 'drawing,' but I don't know how much it could get away with."

These questions were kept up until we reached the ore crusher, and she said that was a "horrid thing," and then dragged me around for two mortal hours to look at the false hair exhibit.

But when I concluded not to take her to the roller skating rink it was not because I was afraid she would take me around to look at false hair. All there was there was in use, and one girl will never tell you to look at another's false hair. She is afraid you will admire it. My sole reason for not taking her was that I hadn't yet learned to skate, and I didn't want to make a fool of myself before her. So I went alone, and as soon as I got there I checked my overcoat and hired a pair of skates. Then I gave a small boy ten cents to put them on. As soon as the aforesaid small boy had disappeared the left one dropped off. I had to give another boy ten cents to put it on again. He hadn't been gone more than five seconds when the right one dropped off. It cost me just sixty cents to have those skates put on so they

would stay "put." Then I stood up and looked about me. I was on a platform, and the floor upon which every one was skating was about two feet below me. As there were signs up all over saying that no skating was allowed on the platform, I concluded I had better try to get down on the floor. I was about to strike out when I observed to my horror that the skates were going in an opposite direction. As I didn't know how to stop I had to go with them. They landed me at the candy counter, and so I had to buy some candy, just to look as if I had come there on purpose, you know. As I was getting some money out of my pocket to pay for it, the infernal skates commenced to go backwards. I think they would have taken me outside in the street that time if the girl at the candy counter hadn't screamed, and a policeman collared me and dragged me back, saying that "I oughter be ashamed to try to run off like that without paying."

This didn't improve my temper to any great extent, and so when an attendant came up to me and informed me that no skating was allowed on the platform, I replied rather angrily, "You infernal idiot! don't you see I've been trying to get down there for the last fifteen min—" Just then my feet slipped from under me and I sat down. The attendant was very kind. He lifted me up and helped me to get down on the floor where the others were skating.

But when I got there it was a glorious thing to glide around the building with the other skaters. It was a glorious thing when the girl in front of me fell down and I tripped over her, and the fellow right behind me tripped over me, and fell on my new silk hat. It was a glorious thing for me to have to get up and apologize to that girl for having tripped me up. It was a glorious thing for me to straighten out that silk hat and reflect that it had only been worn once. In fact, it was all so glorious that I took off my skates and started for home. When I went to get my overcoat I found that there were two places, side by side, where coats were checked, and I didn't remember which one I had left mine in. However, I went confidently to the one nearest me, and handed in my check. The man eyed me suspiciously for a moment and then said:

"Where did you get this check?"

"I thought I got it here," I replied.

"Well, I think you found it, or else you're a pickpocket and stole it," he said.

That made me a little madder than I was before, and so I said :

"Give me that check back, do you hear? Come out here and I'll break your neck. It's a wonder you get anybody to come up here if you insult them like that."

He gave me the check and I went to the next place and got my coat, and as I put it on and walked homeward I realized what a blessing roller skating indeed is.

BESSIE TURNER.

THE LAST OF THE PROPHETS.

I found the Chief Signal Officer in his laboratory, exhausted by the hard work of the day. His majestic person was somewhat placidly disposed in a great easy chair. His feet rested on top of a barrel, which was covered with a copy of Hayden's expensive Atlas of Colorado. In the lap of the Chief Signal Officer was curled a big black cat, which purred as he listlessly stroked its back, and showed its teeth when he happened to stroke the fur the wrong way. On the Chief Signal Officer's left shoulder was perched a Plymouth Rock rooster. Several hens of various breeds were scratching the floor under the table, in the futile endeavor to extract nutriment from an oil cloth carpet. The Chief Signal Officer motioned me to a chair, and hurled a volume of his annual report for 1882 at a noisy duck which was screaming in one corner of the room.

"General," I began, "is it true—"

He interrupted me with a peremptory gesture. "Hush," he said.

I became silent. Through the closed window the stentorian voice of an able-bodied donkey was distinctly audible. The donkey brayed four times, each time louder than before. The Chief Signal Officer tumbled the cat out of his lap, made a few hurried notes in a memorandum book, and then turned to me again.

"General," said I, "will you permit me to ask if the statement that you have—"

Just then the rooster on the left shoulder of the Chief Signal Officer began to flap his wings and crow. The Chief Signal Officer touched a hand bell.

"Send Dunwoody here at once," he said to the child of Africa who answered the summons. "Now, sir, I am at your service," he remarked to me.

"General," I began once more, "it is currently reported that you have—"

I paused, for the hair on the top of my head was at this instant firmly clutched from above, and held in a tenacious and constantly tightening grip. I started up in amazement.

"Sit still! sit still!" shouted the Chief Signal Officer. "It is only one of my bats—the lower Mississippi Valley bat, I think. Don't move a muscle till we see what the lower Mississippi Valley bat is going to do."

I sat patiently in the interests of science for at least five minutes. Then the unpleasant bird, beast or reptile slowly relaxed his hold upon my hair and flew away with a dismal whirr. The Chief Signal Officer rang his bell again, scrawled a few words on a telegraph blank and handed it to the messenger.

"Well, sir, now what can I do for you?"

"General," I said, "you can tell me, if you please, whether the public may credit the report that you have—"

"Ah! here is Dunwoody at last," exclaimed the Chief Signal Officer, the anxious expression of his countenance giving place to a look of relief. "Dunwoody, the black cat has mewed thrice in three minutes."

"You don't say so, sir," remarked the newcomer, respectfully.

"Copernicus is crowing rather hoarsely this evening."

Dunwoody cast a critical glance at the Plymouth Rock rooster. "That is a bad prognostic," he observed. "And I think, all things considered, we had better weigh Howgate."

Dunwoody immediately approached the barrel on which the Chief Signal Officer's feet had been resting, and removed the cover. Both the lieutenant and the chief peered in long and intently. Then Dunwoody took from a hook on the wall a small landing-net, with which he proceeded to drag the contents of the barrel.

After several ineffectual efforts he scooped out a small but healthy codfish, dripping with brine, and floundering helplessly as Dunwoody laid it on the platform of a small pair of scales.

"Sixteen and three-quarters," he said.

"Do you mind telling me," I asked, "why you call that fish Howgate?"

"Because we keep him out of sight," said the Chief Signal Officer hastily, without looking up from his memorandum book. "Let's see! The noon entry is fifteen-half; two

o'clock, fifteen-quarter. Dunwoody, that d—d cod has gained a pound and a half since two o'clock."

"My gracious!" said Dunwoody.

The greatest alarm was now visible upon the Chief Signal Officer's face. It was evident that the portent was extraordinary. He turned to me, as if for sympathy.

"What does it indicate?" I ventured to inquire.

"Indicate, man?" he shouted. "It indicates that a devil of a gale is brewing somewhere. It is an ascertained fact that a codfish takes in ballast before a storm. But a pound and half in four hours! The records of the office show nothing like it. Why, the fish gained less than six ounces in the seven hours preceding the great tornado of September! Send out a general alarm, Dunwoody, without an instant's delay. Order up the cautionary signals all along the Atlantic coast. Warn the observers at the lake ports! Predict areas of unprecedentedly low pressure on the southeast Rocky Mountain slope, in the Upper Lake region, in the Florida Peninsula, and the St. Lawrence Valley! Predict 'em everywhere! D— it, predict anything you please, Dunwoody! You can't draw it too strong! A pound and a half in four hours!"

Dunwoody rushed off as though a cow-catcher was at his heels, and the Chief Signal Officer began to write message after message like one whose life depended upon his celerity. The lively tick of telegraph instruments sounded in the next room. People hurried to and fro in the corridors. There was every indication of sudden and remarkable activity throughout the headquarters of the weather bureau. At last the Chief Signal officer arose and drew a long breath.

"Phew!" he said. "Everything has been done that can be done. All we can do now is to catch on to something by our eye-teeth and wait till the racket's over." Then he perceived me again. "Hallo!" he said, rather curtly. "You here still? Well, what can I do for you now?"

"General," said I, "I called to learn whether it is true that the Signal Office has just procured a new Bulgarian bullfrog, who tells you by the way he jumps which way the wind is going to blow?"

"Certainly, it is true," replied the Chief Signal Officer; "and he affords some of our most valuable prognostics. He is a great accession to the service. You can see him if

you like; he ought to be somewhere about the floor."

We searched the floor, but found no bullfrog. The Chief Signal Officer once more rang his bell.

"George," said he, "we can't find Sir Isaac Newton. Where is Sir Isaac Newton?"

The darkey grinned.

"De bullfrog, Gen'l?" said he. "De bullfrog 'peared too lazy to prognosticate dis afternoon, and I done put him in de barrel to soak 'long wid de fish."

With a remark indicating a limited area of uncommonly high pressure, the Chief Signal Officer kicked over the barrel. A gallon or or two of brine rushed out, and on the tail of the flood the codfish came sprawling, but there was no Bulgarian bullfrog there.

Our minds grasped the situation simultaneously. We exchanged a look of intelligence. The Chief Signal Officer sank back in his arm-chair, and his face was very white.

"O, Lord!" he faintly groaned, "Howgate has swallowed Sir Isaac Newton!"

That is why the terrible cataclysm recently predicted by the Signal Service Office did not come to time. The prognostication was based on misleading data. The codfish gained a pound and one-half in four hours, because he swallowed the bullfrog. But what a tornado it would have been!—*Ex.*

THE LEGEND OF SNAKE HILL.

Snake Hill, which rises abruptly out of the meadows of the Hackensack, accompanied by a smaller one some few hundred yards distant, has often been noticed on account of the remarkable position it occupies in the swampy land surrounding. With much truth we may compare it to a solitary island in an ocean of marshes.

One bright day during that loveliest season of the year so appropriately called Indian summer, I was strolling over the wooded portion of this hill, almost imagining myself in some yet unexplored region, and barely realizing the fact that the great city was so near. Standing on a rocky cliff on the southern side of the hill and looking over the meadows, I was wondering whether there were any old Indian legends connected with the hill, when I perceived an old man to my right hand side gathering a bundle of the fragrant herb known as pennyroyal. On speaking with him I learned that he was one of the oldest inmates

of the poorhouse on the other side of the hill, and in further conversation I elicited the following legend, which I am confident has never before been seen in print :

Among the first white settlers along the shores of the Hudson was one Jacob Klauser, a well built and substantial looking man of some forty years of age. He was very determined, and, having once made up his mind, nothing short of a miracle could induce him to change it ; besides, he was inclined to be overbearing toward his neighbors, and especially toward the friendly Indians, whom he treated almost insultingly. Indeed, the only good point about him was that he had a beautiful daughter, a most charming maiden, whose lot it seemed to be to make all happy with whom she came in contact. So kind and civil was she to the Indians that they named her Tawaso, the gentle Tawaso.

Kahanota was a chief of no small note in that region ; his name was ever linked with noble and courageous deeds, and he was never known to act unmanly toward either friend or foe. It was his fortune (or misfortune) to fall deeply in love with Klauser's daughter, and she, being aware of the fact, was not unwilling that he should continue his attentions.

After several months had passed, during which he had often seen her and made known his love, Kahanota called at Klauser's cabin, bearing as a present a deer and an eagle, which he had shot. Making known his intentions, and declaring his loyalty, he asked the hand of the fair Tawaso.

Klauser, in a towering passion, at even the thought of such a thing, rudely repulsed him, and commanded him never again to enter his door. Kahanota retired, but planned an elopement with the girl, and one night bore her safely to his wigwam, situated on the hill, whose Indian name was Wakonak, known now to us as Snake Hill.

After the discovery of the deed, Klauser learned the place of Kahanota's retreat, and instantly repaired thither. It was no easy task, however, to reach Wakonak, for the swamps which now appear to us so bare were then a forest of trees and tangled underwood.

However, after much delay, he arrived at the hill, and running up to the summit found it deserted ; Kahanota and his companions had fled. Klauser then rushed down the side of the hill to the river bank, just in time to see a company of canoes in the middle of the river, headed up stream. At first, frantic with rage, he knew not what to do, but then, mas-

tering himself, he thought of a plot. Taking advantage of Kahanota's strict sense of honor and truth, he made signals of peace to him, asking him to return and he would make a treaty, forgiving all.

Kahanota's companions begged him not to return, assuring him that the white man would prove false ; but the chief bade them be silent. "What, will a man lie to Kahanota ?" said he. They pulled ashore, therefore, and leading the girl, Kahanota advanced toward Klauser, who received them with every manifestation of friendliness.

"Come up to the brow of the hill, where the sun may witness our treaty of peace, brother," said he, and the trusting Indian ascended with him to the top of the cliff, accompanied by Tawaso, who kept her hand in his.

There, surrounded by Kahanota's family, the two swore eternal peace and friendship. After some further talk, Klauser, watching his opportunity, rushed at Kahanota and pushed him over the precipice. There was a shout, and several of the younger Indians stepped forward to serve the treacherous white man the same way, but the older ones in the company restrained them, and addressing Klauser in tones of the deepest contempt, Kahanota's brother said :

"The pale face is too base a dog to deserve death at the hands of even his enemies ; let him return with his daughter to his place. We will travel up the river and seek a new home. But look you here, pale face," he continued, "this hill, Wakonak, shall your people inhabit, indeed, but all who do so shall be of your poor ones, your wicked, or your demented !"

With these words the Indians departed, and Klauser returned home with his daughter. The poor girl, however, lost her reason and died of a broken heart. Klauser soon afterward left the place and was seen no more.

With these words the story closed :

"We are standing on that very cliff now," said the old man, "and you noticed, did you not, the poorhouse, the reform school, and the lunatic asylum on the other side of the hills ?"

The old man then left me, and I stood for some time looking over the brink of the precipice and running over again in my mind the legend of Wakonak.

ALBITAN.

WORTH A LICKING.

Some years ago, in Georgia, that band of Christians known as Ascensionists were having a grand revival. One day when the meeting was in full force a storm came up, and a young gentleman who was out hunting with his servant took refuge in the church vestibule. Being curious to see the service, the two hunters crept up into the gallery, and there hid in a place where they could observe without being observed.

"Come, Lord, come ; our robes are ready. Come, Lord, come," cried the preacher, while all present gave a loud "Amen."

"Marse Gabe," whispered Cuffy, lifting his hunting horn to his mouth, "let me gib dem jist one toot."

"Put that horn down, or I'll break your head," replied the master, in a whisper.

The horn dropped by Cuffy's side, and again the minister cried :

"Come, Lord, come ; we are all ready for Thy coming. Come, Lord, come."

"Do, massa, Gabe—do jist lemme gib 'em jist one little toot," pleaded Cuffy, wetting his lips and raising the horn.

"If you don't drop that horn, Cuffy, I'll whip you with an inch of your life," whispered the exasperated master.

"Blow, Gabriel, blow ; we are ready for His coming. Blow, Gabriel, blow," pleaded the minister.

Cuffy could no longer resist the temptation, and sent a wild peal ringing from end to end of the church ; but long before its last echo died away his master and himself were the only occupants of the building.

"I's ready fur de licking, Massa Gabe," said Cuffy, showing every tooth in his head, "for I 'clare to gracious it's worf two lickings to see de way common farm cattle kin git ober de ground wid skeared 'Scensionists' behind dem."

INDICATOR CARD.

We do not desire to raise any false hopes in the minds of our fellow students, but it does look very much like business when we hear of measurements being taken, from which estimates have been made for a new gymnasium. Our source of information tells us that some attention has been paid to the suggestion of one of the students, "that a stock company be

formed and a gymnasium be built, and charge the students desiring to attend, so much, sufficient to pay the company for its investment."

There is no reason why this suggestion should not be acted upon. We certainly ought to have friends enough by this time to advance to us the money for such a project. It is worthy of their notice, and at any rate we do not see how they will be the losers by their kindness, especially as the affair can be made self supporting.

The proposed building, as estimated for, will be seventy-five feet long and forty-eight feet wide, and will be built at the end of the old gymnasium, or, as it is now called, the shop ; in fact, it will be an extension to the shop and put up in very much the same style, strong and substantial, with all modern improvements, and it is to be hoped sufficiently near the boiler to allow of its being heated during the months when it will be most patronized.

A LESSON.

CHAP. I.

There was an inveterate smoker,
Who played a queer game called draw poker ;
He said that his girl
Was a regular pearl,
And he loved her so hard he could choke her.

CHAP. II.

Now his girl knew quite well how to box,
And could strike out quite like a young ox ;
So she hit him a whack
In the small of his back,
Which made him think of a land-slide of rocks.

CONCLUSION.

This young man is no longer a smoker,
He has also quit being a joker,
For he thinks the above
Not conducive to love,
And has become quite an urgent teetot'ler.
E. H.

The election of editors for the INDICATOR Board will be held before vacation. The following is an extract from the Constitution of the INDICATOR : "At the end of each scholastic year the three then lowest classes will elect, each of them, two editors from among their number, to be subject to the approval of the outgoing board ; and at the beginning of the ensuing year the then Freshman Class will elect one editor from among their number."

THE RHYME OF THE HERCULES CLUB.

Bring a ballad of to-day, designed to illustrate the principle of reaction, and to set forth how there may be too much of an excellent thing.

There was once a young man of the medium size,
Who, by keeping a ledger, himself kept likewise.
In the matter of lunch he'd a leaning to pies,
And his chronic dyspepsia will hence not surprise;
And his friends often told him, with tears in their eyes,
Which they did not disguise, that a person who tries
To live without exercise generally dies,
And declared for the sake of his family ties,
He should enter the Hercules Club.

Tom Box and Dick Dumbbell would suavisely say,
If they met him by chance in the roar of Broad way,
"It's bad for a fellow, all work and no play;
Come, let us propose you! You'll find it will pay
To belong to the Hercules Club!"

And he yielded at last, and they put up his name,
Which was found without blame; and they put down
the same

In a roll-book tremendous; and straight he became
A Samson, regarding his tame past with shame;
Called for "Beef, lean and rare!" and cut off all his
hair,

Had his shoulders constructed abnormally square,
And walked out with an air that made people declare,
"He belongs to the Hercules Club!"

And he often remarked, in original way:
"It's bad for a fellow, all work and no play;
Without recreation, sir, life doesn't pay!
And I for my part am most happy to say
I belong to the Hercules Club."

And frequently, during a very hot "spell,"
In thick woolen garments clad closely and well,
"Reducing"—for he was resolved to excel,—
He rowed in the sun at full speed, in a shell
That belonged to the Hercules Club.

And for weeks, while the dew on the racing-track lay,
He ran before breakfast a half mile a day,
Improving his style and increasing his "stay;"
And was first at the finish, and fainted away,
At the games of the Hercules Club.

Six nights in succession he sat up to pore
"The Laws of Athletics" devotedly o'er
(Which number ten thousand and seventy-four),
With a view to proposing a very few more
In a speech to the Hercules Club.

And his coat upon festal occasions was gay
With medals on medals, marked "H. A. A. A.,"
With a motto in Greek (which, my lore to display,
Means "Pleasure is business"), a splendid array
Of the spoils of the Hercules Club.

But acquaintances not of the muscular kind
Began to observe that his brow was deep-lined,
Too brilliant his eye, and to wander inclined;
He appeared, in a word (early English), "forepined;"
And one morning his ledger and desk he resigned,
Explaining, "I can't have my health undermined
By this 'demnition grind;" and I'm getting behind
In my duties as captain" (an office defined,
Page hundred and two, in the by-laws that bind
With red tape the great Hercules Club).

And he further remarked, in most serious way:
"Give it up, did you say? 'Twill be frigid, that day!
Why, without relaxation, sir, life wouldn't pay!
And I, for my part, will remain till I'm gray
On the roll of the Hercules Club."

You perceive, gentle reader, the rub.
Is it nobler to suffer those arrows and slings
Lack of exercise brings—or take clubs, and let things
Unconnected with matters athletic take wings;
Till all interests beside, like the Arabs, shall glide
From the landscape of life, once a plain free and wide,
But now fenced for the "Games" which we lightly be-
gan,
Grown our serious aims and the chief end of man?
There's an aureate mean these two courses between,
But I humbly submit that it seldom is seen,
With all proper respect for that organization
Of benevolent purpose and high reputation,
The excellent Hercules Club!

—HELEN GRAY CONE.

PACKING.

Professor (*Hearing a recitation in Physics*):
"Mr. Blank, whose goniometer is this?"
Mr. Blank: "Yours, sir; I guess."

Student (*Explaining a problem in Analytical Mechanics*): "I have taken the origin of moments at both ends."

Professor (*Trying in vain to suppress a smile*): "That is all right, sir. One of these young men smiled at me, I don't know what about, and I am very sympathetic, and had to smile too."

STUFFING BOX.

Multum in parvo, properly translated, means
Third Term in Stevens.

The catalogue of the Institute for this year
will be out in about a week.

"Turn the twig and the branch will be
straight," says a Hoboken divine.

A letter was sent to a gentleman at the
institute addressed to Rev. M. —, Stevens
Theological Institute.

Two preps, one six feet, the other five feet
ten inches high, passed themselves off as chil-
dren at the lacrosse tournament.

The German band is assuming immense
proportions, both as to tone and size, in this
city of beer and elopements.

It is to be presumed that the students will take more or less interest in the Electrical Exhibition to be held in Philadelphia next fall.

The suggestion of the *Eccentric*, for the two lower classes to straighten the fence about the Athletic Association grounds, is a good one.

The *Eccentric* has arrived, and received a very flattering reception. The next question which agitates the student mind is when will the *Bolt* be out?

Our coat room correspondent sends word that much wealth changes hands in said room from the Freshmen's over delight in the art of pitching pennies.

The idea of a college pin, published in the last number of the *INDICATOR*, was a good one, and we are surprised that no one has taken any interest in it.

The two senior members of the Editorial Board are absent on thesis work; if the *INDICATOR* degenerates at all, our readers will kindly lay it to this cause.

That blooded put-down-two-and-carry-one horse, which is being utilized for motive power at the grounds, is familiarly known to lovers of the Turf as "St. George."

Some of the classes which are kept by the professors over the hour, experience considerable difficulty in attending the next recitation in time to prevent being marked late.

The Sophomores are anxious to give expression to their ideas on Messrs. Shaw & Tuckerman in some befitting manner. A plan is brewing for some kind of a celebration.

If ever you see in S. I. T.,
A man with a broken jaw,
You may bet your shekels five to three
It was cracked while "boning" Shaw.

Mr.—well, we won't mention his name—was much lacerated lately, as the result of a rash attempt to keep himself "heads up" with the large wheel of his bicycle in the street, and the small one groping about for a resting-place.

A Freshie receives mail matter with a C. E. tacked on to his name. Be wary, my boy, or you may fall into the evil practices that some of your predecessors have been overwhelmed in, and they—but at any rate don't become too much titled.

The clock of the German church was stopped quite frequently by the storms of sleet this winter, and has since been trying to catch up. This fact, probably, will explain some of the late marks opposite certain Sophomore's names.

We may congratulate ourselves that our annuals take the form of something readable, and not as most other publications from elsewhere, whose chief aim seems to be to fill page after page with little of interest, excepting printers' ink.

Mr. Randolph, '86, has been obliged to leave college on account of his eyes. They have troubled him considerably since his illness, and his physician has recommended rest. He will not return until next fall, when we hope to see him with us again.

A certain student tells us (and he had entire control of all his senses at the time) that he dressed himself, enjoyed a *good* breakfast, and got to college—three blocks from the house—inside of nineteen minutes. Now, why shouldn't he enter for the spring games?

The Preps have a very good nine, and expect to capture all the glories this season. The battery will be Ducommun, pitcher, and Aldridge, catcher; Whigham, Harvey, L. Mowry and Paltberg comprise the infield, and Phelps, Isaacs and W. Mowry the outfield. Quite a number of games have been arranged.

One of the Sophomores, feeling that his class was not properly sustaining their reputation as a class, invested in a "tile." As soon as he becomes sufficiently acquainted with the laws of equilibrium, and can safely venture out without fear of it toppling off, he will exhibit and stir his classmates to a proper sense of their duty.

Prof. Kroeh is kindly devoting considerable extra time each week to those students in '86 who were unfortunate in German last year. The members of the class who are enjoying this privilege greatly appreciate the effort made in their behalf, and are now unanimous in the opinion "that the German tongue is worth mastering."

The need of suitable accommodations for the visitors at the lacrosse tournament was sadly felt. But there are hopes of a grand stand, for we noted with delight that one of the entertainment committee, from whose efforts the

money is to come for the erection of a grand stand, actually blushed (with shame) when the subject was mentioned.

It is with regret that we note the departure of Mr. Bush for the West. He has gone away on business, and at present he tells us it is probable he will not be here for commencement. Those of us who have known Mr. Bush intimately will greatly miss him, especially as the time draws near for the general jollification at the end of the term.

The general good feeling which exists between the townspeople and the students is a fact worthy of notice. In former years students were regarded as too uncivilized machines to tolerate. The Hoboken paper makes note of all that is interesting about the Institute, and thus helps to increase the already pleasant relations between the Institutuer and Hobokenite.

The entertainment begins to promise something real. The date will be about May 20. The committee propose having a minstrel entertainment, the various parts to be taken by the students. The glee club will occupy a prominent part, supported by the Valencia orchestra of Hoboken. The prospects are promising, and we hope the students will join in the endeavor to make it a success.

One of the mayors of Hoboken, who held the command of a company of militia some years back, was captivating the hearts of his fellow citizens by the soldierly bearing of himself and his company, when a street car appeared and threatened to mar the symmetry of his command; but he was equal to the occasion, and promptly ordered: "Company, split in the middle and let the car pass."

Does the amount of mathematics we have each day interfere with the proper preparation for the other departments? Why, no indeed! A student, after spending several hours hard work on calculus and descriptive, has time sufficient for the other studies of the day to tell his fellow students next morning that Alexander Hamilton, the writer and statesman, "died while on a summer excursion in the country."

A fact has come to light that one who is given to star gazing and navigating on moonlight nights, has rigged up a powerful telescope in his window, which has a swing of sufficient extent to *grasp* all opportunities

which may offer themselves in the neighboring windows. The experiment is a success, if we are to judge from the amount of handkerchief shaking and the frequency of evening voyages, which have long since ceased to be limited to moonlight nights.

The French cannon, which was dug up in the Elysian fields about a month ago, has lost its revolutionary glory, as it has been identified by some of the old residents of Hoboken as the property of a French aeronaut, who made balloon ascensions from the spot now occupied by River Terrace. This was about forty years ago, and the supposition is that the gun was buried at the time of the Turn riots. The Hoboken *Advertiser* had quite an interesting article concerning the history of the piece.

The playing of the base ball team with the picked nine in Brooklyn was a surprise to every one. The pitcher's work was very effective; the catcher supported him well, making some brilliant throws to second base. The fielding ranged from poor to all that could be desired. The game was enlivened by a little foot ball practice on the part of one of the substitutes, who figured to advantage in last fall's eleven; his method of putting men *out* should not be practiced to any great extent, unless some of the opposing nine are playing too well. But five innings were played, the score being 6 to 2 in favor of Stevens.

A—h! says the college student, when "Prof." Donaldson superintended the removal of the winter doors to the Institute, "the foot races and the festive gambols of the Prep, the tramping of his feet and those wild rantings of his will soon be things of the past. Our halls will miss those banana peels and discarded burnt crusts of ham sandwiches, for the merry-making and the lunch counter of the Prep will, until the time for the falling of the leaves, be upon the Campus." And he is content, and goeth away wondering if the base ball team can practise in the drawing-room, for Prepdom has settled on the Campus.

Thusly does one of the sufferers picture the daily scene in Prof. Thurston's room. Mr. B. having finished a recitation sits down. Students abandon their free and easy postures and sit straight in their chairs, and anxiously watch the professor's hand as he slowly and critically travels down the list. A sickly, deathlike stillness prevails; nobody breathes, and one can tell by the spare-me-but-take-my-neighbor

expression upon each countenance that no one has studied the lesson. Slowly but surely the pencil moves on—it stops—it moves on, and stops again. "Mr. M." Mr. M. rises, and a long drawn sigh of relief, sounding like the murmuring of the gentle night wind, goes up from the assembled M. E's, and all is serene once more.

PERSONALS.

'83.

ARTHUR B. HENDERSON is now employed in the Delamater Iron Works, N. J.

F. K. IRWIN is at present employed in the Wisconsin Central R. R. Co., Stevens Point, Wis.

FRANK MAGEE is in New York, with the Commercial Telegraph Co.

THE COLLEGE WORLD.

COLUMBIA.—The college will be represented in the intercollegiate tennis tournament, to be held in Hartford this month.—Tuition prices will be raised from \$100 to \$150 per year.—Fifteen men are in training for a Freshman race, to be held at Hartford during the coming summer.—Every copy of the Columbiad has been sold.—The Freshmen fared badly in the last examination.—Dr. Billings, of Philadelphia, is to lecture on "Sanitary Engineering" in the School of Mines.

HARVARD.—Only one Professor receives a salary of \$5,000 per year.—The average standing of the forty-eight girls in the Harvard annex is higher than that of the men in the University.—Several valuable autograph letters of Christopher Columbus have recently been presented to the Harvard library.—The editors of the *Lampoon* have notified their subscribers that unless unpaid dues are paid immediately the paper will suspend publication.—Out of eighteen Harvard graduates since 1881, who now occupy prominent positions on various newspapers, thirteen were formerly on the staff of one of the college publications.

PRINCETON.—One man will be entered for each event in the collegiate games in May.—A shorthand writing class has been formed.—A club has been formed known as the Princeton College Sparring Association. The Faculty have given the club use of a North College room.—There is to be a six-oared and a four-oared crew; quite a number of men

are practicing daily on the canal.—The European lacrosse team played a game with the Princeton team at Princeton, during the latter part of April.—The second of a series of papers on pedagogics has been delivered.

YALE.—The University crew's coxswain weighs but sixty-four pounds.—Mrs. Lawrence, of Chicago, mother of the late T. G. Lawrence, class of '84, has given the college fifty thousand dollars for a dormitory.—The usual number of Seniors are delaying the picture committee in the vain hope that their moustaches will "brace up."—The fleet of the Yacht Club has a schooner, a steam launch, six cabin sloops and an open sloop.—Twenty-five thousand dollars has been raised for a new building for the Y. M. C. A.—There are 113 men in '84.—The Nine visited Philadelphia and Baltimore during the spring vacation and played two games at each place.—Two hundred students of Princeton took part in the last city elections, supporting and electing the Democratic candidate.—The treasurer of the Foot Ball Association shows in his accounts a total expenditure of \$1,912.04. The association has been self-supporting, having collected no subscriptions, and finished the season with a balance of \$2.26 in the treasury.

ELSEWHERE.—A disturbance between the "miners" and "chemists," in the laboratory of the Massachusetts Institute of Technology, has resulted in the suspension of several students.—The mechanical laboratory of the University of Michigan has had a new upright drill added to their machines. A charge is made that the "Sophs" in the above college spell base ball baze bawl on their bulletin board.—It is stated that during the past term the Lafayette College men did more reading than usual during the second term.—Lehigh has applied for admission to the intercollegiate tennis association.—The Dartmouth faculty have refused permission to the students to "black up" for minstrel performances.—The students of the University of Pennsylvania will attempt to raise one hundred thousand dollars for a gymnasium.—Over one hundred thousand dollars have been given the University of Vermont for a new gymnasium.—The annual "trip" at Lafayette was a complete success, although marred slightly by unpleasant weather.—The Cornell gymnasium is constantly filled with students all the afternoon until dark.—The University of Michigan has thirteen

secret societies.—The New York *Evening Post* now has a regular correspondent at Yale, Princeton, Lafayette, Williams, Amherst, Cornell and Harvard.—Nine American colleges have adopted Oxford hats.

It was decided, at a recent meeting of the college and amateur lacrosse teams, to send a national team to England and Ireland.—Wendell Phillips is said to have been the best scholar and athlete in his class.

EXCHANGES.

The *Electrical Review* of April 3 opens with a description of an international exhibition of electrical appliances and machinery, to be held at Philadelphia the coming autumn, under the direction of the Franklin Institute. This project, which is already under way, has received especial notice from our government, and will probably be, in extent and importance of both home and foreign participation, one of the most notable expositions in this line heretofore held. The *Review* also, in an article on electric railways, makes an energetic attempt to stir up the American public to a realization of our tardiness in making advancement in this line, asserting that, while England has a number of electrical railways in use and in progress of construction, we Americans, who are generally the pioneers and do the commercial experimenting for the world, are, under the able leadership of interested corporations, pottering with wire rope schemes.

Considerable space is devoted to a consideration of the struggle now going on between the citizens and officers of Boston over the proposed reduction of electric light and its replacement by gas, the citizens demanding its retention, while the officials propose making the change. All considerations of expense and other practical points bearing on the question are given, rendering the article a very instructive one. • The journal also contains much other matter relative to inventions and improvements, all written in a practical and interesting manner.

The *American Engineer* presents two articles belonging to two different series on boiler construction and use, the second article of the two treating especially of the blast furnace boiler. In a short article, relative to the proportioning of castings, the too common idea that mere strength, attained by the addition of

so much metal, is the desideratum, is combated by the writer, who shows the superiority of a careful distribution of metal and an efficient system of braces and ribs, which insure proper rigidity and at the same time effect vast saving of material.

The article "Strains and Metals in Marine Construction" is an interesting one, treating largely of the most effective modes of framing and setting up engines in ships. The remaining articles are numerous, and, of course, good.

The April number of *Van Nostrand's Engineering Magazine* opens with an interesting and instructive article on large dams. In this article the variation of points of resultant strain in dams of alternately empty and full reservoirs is illustrated, and the methods of construction, adapted to insure stability under all circumstances, are given and explained. The article on "Testing Machines" is comprehensive. Its chief feature is a detailed description of an elaborate testing machine manufactured by the Fairbanks Co. One of the many excellent features of this machine is, that by transmitting the strain through steel hemispheres, readily movable in polished sockets, the direction of strain is automatically brought into coincidence with the axis of the test piece, thus preventing lateral and irregular strains, which in other machines are liable to be produced. In addition to these articles is an elaborate one on "The Theory of Stadia Measurements," and another on the flexure of long columns, in which the writer, Professor S. W. Robinson, defends one of his former productions against the attacks of Professor W. H. Burr. The remaining articles are numerous and worthy of attention.

The *Electrician and Electrical Engineer* contains, in addition to a number of interesting editorials, several very instructive articles. The first of these is the concluding article of a series by Professor Thurston on "Steam Engines for Electric Lighting Plants," in which are explained and discussed two interesting forms of the high speed engine—one designed for electric lighting purposes, by John Ericsson, and the Westinghouse engine. The latter, which is a single acting engine of novel construction, has attained, experimentally, the remarkable speed of 2,700 revolutions per minute. The succeeding article is a critical review of some of the work of the jury in the recent electrical tests at the Cincinnati Exposition, the writer demonstrating

the inaccuracy of both the work and deductions. An excellent article is one of a series on the "Mechanical Explanation of Electric Units."

The first April number of *Mechanics* is filled with excellent articles, accompanied by the best of illustrations; the latter are a decidedly noticeable feature of the paper. Two interesting articles are: one, on a new form of boiler, the Pelestot, of French design and manufacture; and the second, on an automatic valve motion, designed for winding engines; both are accompanied by complete drawings.

The *North Western* for April contains, in addition to a considerable amount of local matter, a well written article by a free trade writer on "The Surplus Revenue," the various dangers arising from the present rapid accumulation of revenue receipts being presented and remedies proposed and discussed.

The first April number of the *Oberlin Review* is an excellent one, two very entertaining articles being given, one on "The Poetry of James Russell Lowell" and the second on "Bret Harte." The traits of character of both writers, as manifested in their writings, are presented, the selections given being well interpreted and displaying judgment on the part of the writers.

The *Columbia Spectator* is very well gotten up, and a pleasing feature of the paper is the illustrations. The issue of April 10 shows, however, a lack of activity on the part of contributors, the articles given being few and short.

We have received from the Deane Steam Pump Company their catalogue, in which all of the numerous forms of their popular machines, from the smallest up to the heaviest water works machinery, and embracing arrangements for almost every kind of work, are clearly represented and explained. The book is a model one, both illustrations and typography being excellent, and contains, in addition, several pages of tables and other useful information for the engineer.

We have received the following additional exchanges: *Mechanics* of April 26 and also monthly number, *American Engineer* of April 11 and 18, *Electrical Review* of April 10, *Hudson County Democrat Advertiser*, *Bowdoin Orient*, *Willistonian*, *Adelphian*, the *Wheel*, *La-Fayette College Journal*, *Targum*, *Lehigh Burr*, the *Tech*, *University Herald*, *Michigan Argo-*

naut, *University Magazine*, *University Courier*, *Virginia University Magazine*, the *Polytechnic*, *College Argus*.

Of the two yearly publications which the Institute has the honor of producing, the elder, the *Eccentric*, has this year the good fortune to be first in appearance. We are pleased to note its arrival, and congratulate the editors on the success which has attended their efforts. Although there are some points in which the paper could be better, there is very little work of which this same may not be said, while, on the other hand, the good features are numerous and noticeable, and the paper generally reflects credit on the managers. We wish it a long career and continued improvement and success.

CHIPPINGS.

"Whose ferry boats are these?" growled a Senior as he stumbled over a pair of shoes in the hall.

"Ferry boats, indeed, sir!" said a pretty face, opening the door. "Those are my shoes, sir. Very polite of you to call them ferry boats, sir."

"I didn't say ferry boats; you misunderstood. Fairy boots, I said, my dear young lady." It takes four years to do that.—*Ex.*

SONG OF THE EDITOR.

O for a horrible holocaust,
Or an accident awfully solemn,
An earthquake, a riot, or anything weird,
If it only will fill up a column.

—*Yale Record.*

EPITAPH ON AN ASTRONOMER.

The stars to him were meat and drink and sleep; it
was his sole delight
To scan the sky with telescope and transit all the live-
long night.

A perihelion on his head, a syzygy in either hand,
He's climbing up the ascending node to reach that
better land.

—*Ex.*

CAVALRY.

In barbaric, unlearned, dark ages,
In the time of the Frank and the Norse,
We're instructed by chivalry's pages
The dependence of man was the horse.

Now the world is considered quite learned,
And it ridicules helmet and corse;
Notwithstanding professors and sages,
The dependence of man is the "horse."

—*Ex.*

PROF. IN CHEMISTRY: "Will the liquid in a crucible evaporate more rapidly with the lid partly on or partly off?"

THE STEVENS INDICATOR.

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THE

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The Stevens Indicator.

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BY THE STUDENTS OF
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Editors.

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BUSINESS EDITOR, A. P. KLETZSCH, '84.
EXCHANGE EDITOR, JOHN M. RUSBY, '85.

Local Editors.

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Professors, alumni, undergraduates, and friends, are invited to contribute literary articles, items, verses, discussions of current topics, and personal notes.

It is particularly desired that Alumni furnish us with all items of interest concerning themselves and every one who has been connected with the Institute.

It is expected that all articles shall be written in a courteous tone.

The writer's full name, as well as his NOM DE PLUME, must accompany the article, as assurance of good faith and reliability; but it will not be published, unless desired.

The editors do not necessarily endorse sentiments expressed except in the editorial and exchange columns.

Publishers are invited to send us books and magazines for notice or review.

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All persons wishing to secure the business patronage of students and alumni will find it to their advantage to send for our advertising rates.

THE report of the entertainment committee, which proved a disappointment to so many, adds one more drop to the long ago overflowed bucket full of reasons why we need a gymnasium.

The committee, who deserve much credit for their diligence, succeeded in raising a very attractive programme, and when everything was in readiness were unable to obtain a hall in which to hold the affair. They made three applications for the German Club hall, and were refused each time, while the rates charged for Odd Fellows' hall were so high as to defeat the object of the entertainment, hence it was given up entirely.

When we get our gymnasium we will be independent of hall owners, for we will have our own hall just as they did six years ago, when dramatic entertainments were quite frequent.

THE enterprise of Eighty-four in making up a more extended programme for Commencement week, is to be highly commended. We had long been waiting for the time when the size of the Institute should warrant the introduction of Class Day exercises and the preaching of a baccalaureate sermon. Eighty-four is to be heartily congratulated upon the good management which rendered her Class Day, the first to be held at Stevens, a signal success. Not a little of this success is due to the great kindness of Mrs. Stevens in allowing the use of her magnificent lawn for the occasion. Should Mrs. Stevens deem it advisable to tender this most beautiful spot in the country for use on similar occasions in the future, Class Day at Stevens must necessarily be far ahead of those at other colleges. We hope that these features of Commencement week will remain

an established custom of the college, and if so, they will be a worthy monument to the memory of Eighty-four.

AND so the year has come to a close again; the last term is ended, and the last lesson conned. As the term came toward its end, the Freshman became bold in his movements: he no longer had the green look that was so noticeable when we were introduced to him. His bearing seemed to say, I am not a Freshman, you must look elsewhere, you must look elsewhere. And this reminds me of a story which, if my memory serves me truly, is to be found in one of Scott's charming tales. A certain Irishman was struck on the head with a shillalah, while he was enjoying himself in a village frolic. Mike was carried home to his sorrowing wife, a supposed corpse. The wake soon followed. Mike's choice store of whiskey was freely dealt out by the new made widow, and all was gayety. The blow had not, however, quite ended Mike. When the festivities were at their highest pitch, and whiskey was flowing as freely as water, and the widow began to look jolly, Mike "came to." He had been stretched out on a pine board, and to the amazement and terror of his friends and relatives, he suddenly and without warning arose. Seizing the board, he began to deal blows to the right and left with much vigor, at the same time giving vent to his thoughts by saying: "Bedad! I'm not ye're corpse, at all, at all: Ye must go elsewhere, ye must go elsewhere." So it was with all of us—Seniors, Juniors, Sophs and Freshies—all were not what we seemed to be.

And now a year already rises before us, with many difficulties to surmount, many hours of weary toil and little rest; and when we think of it, I doubt if any of us feel quite equal to the tasks that we know the coming year will bring us. But after a couple of months at the seaside, the mountains or the breezy plains of the West, we will come back with new resolves, new energy and relish for study.

There is something sad in the fact that the

vacation of one class from the Institute will last forever. The years crowd one on another so rapidly that we can almost see the class of '84 before us as they will appear in twenty years. We think we see some distinguished men among that future group of careworn engineers, a group much grayer, much sadder, much smaller than when they leave the Institute this month. We cannot see all the faces that we know so well. Ah! there is little cause to ask the reason why; and so leaving the idle fancy where it is the saddest, we turn to more cheerful thoughts. We wonder how many of the class of '84 are engaged, and if so if she is pretty or wealthy, or both. Will she be kind and tender and true to him through all the coming years? and, perchance, if she should happen to see this harmless scribble, will she accept our best wishes for a joyful future and a happy home?

And thus, like Tiny Tot, in Dickens' Christmas story, we bid "good bye to all, God bless us every one."

THE base ball season was a very short and unsuccessful one in all respects. Stevens won but one game of any importance in defeating the champions of the league. Of the other games played none even deserve mention. The Board of Directors of the Association are principally responsible for this disastrous season, as they ought not to have permitted the captain of the base ball team to take out the men which he did, and all games excepting those of the college league should have been declared off.

In order that the captain of the foot ball team does not make a similar showing next fall, the Board must assist him in every possible manner. All games ought to be arranged by the directors, as was the case last fall; and in order that the captain can give his entire time to the team, a good business manager must be appointed. The umpire, if selected by the Board, and if a good business man, could act as such, and see to all arrangements

with other associations with which games have been arranged, to getting out posters, looking after suits, and other business too lengthy to mention.

The good effect of training was also plainly seen last fall in foot ball, and a still more thorough and rigid system ought to be introduced. The Board must notify as early as possible each and every possible candidate for the team as to what is expected of him, and no exception whatever should be made. If it has been proven that he has violated the rules imposed upon him, the directors should not hesitate an instant in putting him off immediately, before causing dissatisfaction amongst the remaining members. It was a noticeable fact during the last season in foot ball, that the poorest players were those who sneaked off to take an occasional smoke, and otherwise violated the rules.

The training of the team in gymnastics and calisthenics should also be carried to a greater extent, and a long and easy run each day would be of inestimable value. Great rivalry is already apparent amongst students for places on the team, and this is sufficient to insure a good system of training. Practice games with smaller colleges about here ought to be played as early as possible. Then put on a finishing touch by tackling Yale, Princeton and Harvard, during the first weeks in October, and at the close of the season Stevens will again stand foremost amongst the non-association teams.

COMMENCEMENT WEEK.

The exercises of Commencement week, which were unusually elaborate this year, opened on Sunday, June 8, with the baccalaureate sermon by Prof. Wall. Nearly all of the Senior class, together with many other students and friends, assembled in the First Presbyterian Church in the morning with spirits as bright as the weather.

The first thing noticed was the beautiful array of flowers, whose fragrance filled the church, and bore great credit upon the friends of the class who so kindly arranged them.

In choosing his subject, Prof. Wall stated that he had endeavored to find one which would be of interest as well as profit to his hearers. He was well rewarded with success on this point, for every passage commanded the closest attention of all present.

BACCALAUREATE SERMON.

The text may be found in I. Chron. xxii. 12: "Only the Lord give thee wisdom, * * * that thou mayest keep the law of the Lord thy God."

He spoke of the existence and supremacy of moral law, by which was meant such an order or sequence of actions and their effects that right actions promote the well doing of men and wrong actions produce evil effects.

The Ten Commandments are the sublimest exposition of the duty we owe to God and man, and therefore include moral laws. But independent of the Bible, moral law may be discovered by study of human conduct and character.

Men even when unenlightened by Christianity or rejecting revealed religion, acknowledge such laws; the philosophy of the ancients, writers of our times, in the one case ignorant of, and in the other disbelievers in, Christianity; the history and literature of all nations declare it. The one lesson taught by historians is that "Righteousness exalteth a nation, but sin is a reproach to any people." All civil or criminal laws are or claim to be based on moral laws. The punishment for their violation is not always immediate, but always sure. That it follows so gradually is due to the perfection of their working. Showing the importance of regulating conduct by these laws, which are "the laws of the Lord thy God," the Rev. Professor exhorted the young men to so act in all their relations to their fellow men that their influence would be in favor of purity in public and private life, integrity in the discharge of every trust. The powers have passed from the rulers to the people. Virtue and religion are the only powers which can direct to wise and beneficent ends the energies of the people of this country.

On Monday night Prof. and Mrs. Thurston held their Senior reception. The Glee Club and many young lady friends were also invited, and the evening was most pleasantly spent. The Glee Club rendered several selections, which were well received. A feature of the evening was the presentation by Prof. Thurston, through one of the members of the class, of a package of brain food to Mr. Parker, as Chairman of the Board of *Eccentric* Editors, "in order to supply a much needed loss sustained by the almost superhuman effort in the production of the article in this year's *Eccentric*, entitled 'A Faculty Meeting.'"

CLASS DAY.

The weather on Tuesday disappointed many by appearances of storm. After a short rain in the morning, however, the clouds began to break, and to all appearances the afternoon would be favorable to the Class Day exercises.

which were to be held out of doors. Mrs. Stevens generously consented to the free use of Castle Point for the occasion, which was an inestimable improvement on the "the Campus." By three o'clock, about three hundred people had assembled, among whom were many representatives of the fair sex. The inadequacy of the supply of chairs was soon rendered evident, as there were barely enough to furnish sittings for the ladies.

There was a short delay before the exercises commenced, caused by the tardiness of some of the members of the Glee Club. The audience, however, felt no impatience, as the beautiful surroundings and magnificent view furnished ample entertainment for a much longer period.

Finally, the Vice President and Secretary of the class mounted the platform, and the proceedings were begun by the calling of the class roll by the Secretary.

Handsomely engraved programmes had been distributed, which were as follows:

PROGRAMME.

Music, - - - - -	'84 GLEE CLUB.
Introductory Address, - - -	KENNETH TORRANCE.
Class History, - - - -	FRANK VAN VLECK.
Music, - - - - -	'84 GLEE CLUB.
Class Poem, - - - -	ERNEST HOWARD FOSTER.
Music, - - - - -	'84 GLEE CLUB.
Class Prophecy, - - -	WILLARD STEWART TUTTLE.
Music, - - - - -	'84 GLEE CLUB.

Presentation of gifts to each member of the class.

Chorus—Class Hymn, - - - CLASS OF '84.

Vice President Torrance read an introductory address, welcoming the visitors and speaking of the regret which President Renwick felt at being kept at home by a lame knee.

Then followed the class history by Mr. F. Van Vleck.

CLASS HISTORY.

The past, with its intense interest, presses so closely upon us that it seems as part of the present. These four years of our course have gone with lightning rapidity, and now all appears as existing in its momentary after glow. The time which has thus appeared so short, by contrast with what we have accomplished, shows it to be a long period.

Four years ago to-day what was our condition as a class? We yet had no existence, but as individuals we were in the throes of acquiring in a minimum of time a maximum of learning, preparing for our entrance to this Institution, of name immortal and sublime to our youthful imagination, with a tension upon the body and mind only known to those about to enter college.

* * * * *

The class numbered about 46 men, or, more accurately, boys, representatives from all climes and con-

ditions of men—the hardy sons of the soil and the dapper dudes from the avenues; some from behind counters, and one from the imperial family of the Celestial empire. Such was the rough material which this institution of machines was to manufacture into renowned scientists and engineers.

Freshman year passed with a monotony which we, poor innocents, at the time, considered to be full of the grandest excitement. To the credit of the class, no attempts were made at a cane rush; the class above, being so small in numbers, concluded that "discretion was the better part of valor." The same peaceable spirit was manifested during our Sophomore year. In fact, all through our course has been singularly devoid of all harrowing practical college jokes, midnight baths, greased railway tracks, damaged municipal property, class suspensions, etc.

* * * * *

Junior year saw us bright with the hope that as we were on the home stretch of the course, all would be clear and easy sailing. Alas! to how many this hope proved delusive. Work was piled upon us as never before. Then commenced the circulation of petitions, for which our class has become famous.

Those who were spared to become Seniors, were further astonished to see that the work mapped out for them to be accomplished in two terms could hardly be accomplished in two years. We petitioned the Faculty, and this was magnanimously remedied. And now our Senior year is about to breathe its last. Behold! before you, the finished product, and exclaim in the words of the immortal Shakespeare: "Most potent, grave and reverend signiors." It is difficult to adequately appreciate the high and lofty character of their sublime intellects. Consult but the subjects of their theses and you will be bewildered by their gigantic erudition. A professor himself exclaims: "They will be handed down to fame." And as these represent the average ability of the members, the class is destined to be immortal. The entire technical press of the land is awaiting with bated breath the appearance of '84's theses, and their publication is expected to mark an epoch in the modern engineering age.

* * * * *

On looking back over the years that have gone, we find many changes. Our ranks have always maintained the same number, but their occupants have been gradually changing. Twice have we been sorrowfully reminded that all are mortal. That "fell sergeant, death, has been strict in his arrest." The first thus to be taken was Henry Stehr, in our Sophomore year. Then, as we were about to enter our Junior year, William McFarland was called.

Now that we have completed the course, we look back upon its scenes and events and perceive that these four years are a miniature of the world's real life—strivings for place and power, seeking the bubble reputation with as much assiduity as our elders outside of classic halls.

Some of the facts given may be thought somewhat exaggerated; but as figures cannot lie, we shall present some of the class statistics.

The class will graduate 42 men.

The average height is 5 ft. 10 $\frac{1}{4}$ in.

The total height is .408 of a mile.

Our tallest man is Jacobus, 6 ft. 3 $\frac{1}{2}$ in., and our shortest, Miller, 5 ft.

The average weight is 148 lbs. 10 oz.

Our heaviest man is Kletzsch, and our lightest, Carroll, the class skeleton.

The total weight of the class is 3.1 tons.

The average and total age of the class could not be computed, as many members were so conscientious and were so afraid of exaggerating their age, that many of them erred in the opposite direction. As far as observation goes, it has been concluded that the average age is about 22 years. Likewise in obtaining the dimensions of the pedal extremities, the same failing was manifested. Many would have us actually believe that their feet measured but six or seven inches in length, hence it could not be accurately ascertained who was the possessor of the smallest. But in the case of the largest pair, the "truth is mighty and will prevail," whether or not their owner would so have it. The arctics wherewith he was wont to clothe them were for a time in the Bartholdi loan exhibition of rare curiosities.

Among facial disfigurements may be noted four *real* moustaches, with sideboards to match, and 32 which approximate more or less closely thereto. The prevailing tendency of color is toward cardinal or hemp.

The appellations by which we are known to each other are such as, Boy, Jab, Hans, Beecher, Bushy, Kinck, Uncle Fay, L. D., Sleepy, Double, Faber, E. H., F. W., Anna Lise, Jakey, Baby, Mack, Spider, Bessie Turner, Billie Mahone, Katy, Bruiser, Electrosilicon, etc.

* * * * *

It is easily observable that our class is plenteously endowed with the highest order of ambition. On canvassing it was found that all the great professions of the age were to be represented. The aspirations of some are so great that they even hope to reach the exalted station of a chemical laboratory imp, a hod carrier or a barber. Others aspire to strut the quarter deck of the Queen's Navee or "the applause of listening senates to command." Some even more modest have no doubts but that they are to fill the executive chair of the United States.

But two more days and history for '84 shall cease, and this class, which we have had the presumption to think incomparable, will become a thing of the past, but will never be effaced from our hearts.

"If stores of dry and learned lore we gain,
We keep them in the memory of the brain:
Names, things and facts—whatever we knowledge
call—

There is the common lodge for them all;
And images on this cold surface traced,
Make slight impression and are soon effaced.
But we've a page more glowing and more bright,
On which our friendship and our love to write;
That these may never from the soul depart,
We trust them to the memory of the heart.
There is no dimming, no effacement there;
Each new pulsation keeps the record clear;
Warm, golden letters all the tablet fill,
Nor lose their lustre till the heart stands still."

Mr. E. H. Foster then read the class poem:

CLASS POEM.

Fellow classmates, here at last,
Our toilsome journey having passed,
I greet thee on this eve of life,
Which at the best will be but strife;

For scarcely can we claim to know
How things outside of College go.
Although our lives are one-third gone,
We have our work but just begun.
Whatever shall be our success,
Much unto some, to others less,
In each case will it all depend,
Not only on the time we spend,
But on our interest in our work,
And absence of a wish to shirk.

As now we are about to start,
Not any great distance apart,
Much like unto a splendid race,
So often watched with eager face,
Our college training is to us,
A preparation generous.
Our character our bit shall be;
Our colors are integrity;
Behind us in the sulky rides
Each man's own name, he so much prides;
Our backers and trainers shall be
The members of the Faculty.
With fairness, firmness not to budge,
The whole great world shall be the judge.
O, could I now but look ahead
And see what Prophet Tuttle said,
Or if not yet, quite soon will say,
Who'll be ahead some future day?

The course of life we have picked out
Is great and noble without doubt;
The grandeur of its works sublime
Are to be met in every clime.
Had not the pen dethroned the sword,
Hammer and chisel would afford
A rival dangerous, I ken,
Which now works with the mighty pen.
The Seven Wonders, one of which
Alone would render the world rich,
Are all the work of engineers;
And at the present it appears
That, if the much sought eighth is found,
In it will science much abound.
The railroad, steamboat, telegraph,
And almost everything we have,
Are but the work of leading minds
Which one in our profession finds.
The engineer letters must know;
The man of letters—goodness—oh!
It is too much to imagine,
How he would try to make a pin.
The Brooklyn Bridge, upon whose size
Millions do gaze with wondering eyes,
Was not built by a language dead,
With classics for a figure head.

One tribute to our Institute,
Which doth bring forth such noble fruit.
Though young in years, her name expands
Throughout nearly all foreign lands;
And, though her sons are yet but few,
We find *them* high in science, too;
For, by her strict and thorough course,
Has fairly taken all by force,
And won herself a reputation
Above all others in the nation.

But to return unto our class.
Let us these last few moments pass

In looking back, recounting facts
 And meditating on our acts.
 Our stay at Stevens has been one
 In which improvements have been done.
 The first great act our name surrounds,
 Finished the fence around the grounds,
 Thus keeping out the festive Mick,
 With which Hoboken is quite thick.
 In Freshman year we lost our Gym.,
 And since have tried to replace him ;
 While now it looks as though ere long
 Students shall once again be strong.
 The Presentation of the Shop
 Gave to the Institute a prop
 Which cannot be too much thought of,
 And, as though that were not enough,
 President Morton, so generous,
 Founded an electrical course.
 We also were among the men
 To sit upon th' electric pen ;
 And we are quite happy to say
 The hektograph went in our day.
 Athletic meetings were revived,
 A tennis tournament was tried ;
 A splendid glee club mainly due
 Unto our efforts, not a few ;
 While we did, by the largest part,
 The STEVENS INDICATOR start.
 In foot ball, base ball, great success
 Attended captains from our class.
 Our valiant deeds are many, quite,
 Which, but for modesty, we'd cite.
 As to the genius we possess,
 Much could be said without a guess.
 Inventors we have in full force—
 They have propped out all through the course ;
 They now have but to fan the spark
 And we will see them make their mark.

Thus we with different virtues blest,
 And not afraid to stand the test
 Will forward move, onward and up,
 Determined not to drink the cup
 Of hopeless failure or despair,
 However poorly we may fare.
 With our old motto for our star,
 Always " *Esto perpetua*,"
 Which now we hope with renewed zeal,
 Will to our loyal hearts appeal.
 Let us advance as engineers,
 And when we meet in future years,
 Thus it shall be our pride to say,
 We graduated the same day ;
 And cry with sound almost a roar
 Hurrah ! for Stevens Eighty-four.

During the reading of the poem a few drops of rain began to fall, and it was thought advisable to adjourn to the large piazza of Stevens Castle before proceeding any further. Fortunately this was close at hand, and in a few minutes order was restored and the exercises continued with a Glee Club song, followed by the class prophecy by Mr. W. S. Tuttle.

Next followed the presentation of gifts, which gave rise to much laughter. Among these were such suggestive articles as a toy bed,

gun, lamb, powder puff, lemon squeezer, tin whistle, doll's arctics, etc. The doll's arctics were the best hit of all, but the point was entirely lost by the absence of Mr. Jacobus, for whom they were intended.

Two long stemmed clay pipes were given to each lady, one with a red and the other with a gray ribbon tied on, while each of the gentlemen were presented with a pipe, and together with the class smoked the pipe of peace. While this was going on the class sang the class hymn, at the conclusion of which the festivities were over.

The Glee Club rendered several excellent selections, which sounded well, notwithstanding the disadvantage of being in the open air. On the whole, Class Day exercises were voted a success.

At 11 p. m. the class again assembled at Martinelli's, where they enjoyed their class dinner.

The next thing in order was Prof. and Mrs. Leeds' reception on Wednesday night, where the class was again favored with singing by the Glee Club.

During the course of the evening a pack of cards were distributed among the Seniors, and then one of the men drew a card from another pack, and whoever held the corresponding card was to receive a handsome gold scarf pin as a present from Prof. and Mrs. Leeds. Mr. Brainard proved to be the fortunate one.

COMMENCEMENT DAY.

Thursday, June 12, was Commencement Day. The first thing to occur was the Alumni meeting in the afternoon. The Senior class had been previously elected to membership by the Governing Committee, and consequently many of the class were present. President Kursheedt and Secretary Idell officiated.

The following officers were elected :

<i>Pres.</i> , - - -	Mr. WM. KENT, '76.
<i>Vice-Pres.</i> , - -	Mr. F. E. IDELL, '77.
<i>Rec. Sec.</i> , - -	Mr. A. P. TRAUTWEIN, '76.
<i>Cor. Sec.</i> , - -	Mr. T. F. KOEZYLY, '75.
<i>Treas.</i> , - -	Mr. A. RIESENBERGER, '76.
<i>Directors</i> , - -	{ Mr. E. TATHAM, '81,
	{ Mr. D. S. JACOBUS, '84.

Thus Eighty-four enjoys the unprecedented honor of having one of her members elected an officer in the Alumni Association during his first year of membership.

Each of the members of the Faculty present made some remarks, and President Morton

stated that Mr. Leavitt had written his regrets at not being able to be present at Commencement, and enclosed fifty dollars to defray the expenses of the graduating class. Mr. Torrance, in behalf of the class, stated that they had already paid all expenses, and that they desired to turn the money over to the beneficiary fund, believing that in this way it will do the most good.

The question was raised as to the advisability of the recent action of the Faculty in limiting the entering class to fifty, and choosing these men by the entrance examination. Prof. Wood stated that the Faculty had discussed many plans, and had merely decided to try this one (which is similar to that used at the Naval Academy) as an experiment, or until a better one was proposed and which the facilities would allow. The question of enlarging the Institute was raised, and an objection found in the want of means. The alumni decided that the field for present action, was to correct the prevailing impression of the wealth of the Institute, with a view of obtaining further endowment.

Immediately after the alumni meeting, President and Mrs. Morton held their annual reception. The attendance was larger than ever before.

The Commencement exercises were held in the evening, at the First M. E. Church. The Juniors had tastefully decorated the hall with flags, and at eight o'clock the Trustees and Faculty marched up the left aisle, and the graduating class, numbering forty-two, each with a daisy in his button hole, marched up the right aisle. The following programme was distributed among the audience:

ORDER OF EXERCISES.

ORGAN PRELUDE, - - -	WM. S. CHESTER, '86.
Prayer, - - -	
Introductory Remarks, - -	By PRESIDENT MORTON.
FINALE, - - -	Lurline. - VINCENT WALLACE.
Salutatory Address, - -	CHAS FRANCIS PARKER.
SELECTION, - Heart and Hand. - - -	Lecocq.
Address to Graduating Class, PROF. DE VOLSON WOOD.	
GALOP, - - -	Cordon Rouge. - - - Diller.
Remarks by Distinguished Visitors.	
SELECTION, - Beggar Student, - - -	Millocker.
Conferring of Degrees and Announcement of Prizes.	
COLLEGE AIRS.—Selected. - - -	Diller.
Valedictory Address, -	HENRY ROBINSON REA.
SONGS, - - -	Class Quartette.
ORGAN POSTLUDE, - - -	WM. S. CHESTER, '86.

GRADUATES AND SUBJECTS OF THESES.

Graduates Receiving Degree of Mechanical Engineers.

W. S. ALDRICH, N. J.	
HARVEY F. MITCHELL, N. Y.	
Automatic Engines: Practice and Theory (Experimental Investigation).	
JAMES S. ALDEN, N. J.	
The Storage of Electricity.	
WILLIAM O. BARNES, N. J.	
RICHARD L. FEARN, Ala.	
The Theory of Steam Injectors (Experimental Investigation and Revision of Theory.)	
JAMES BEATTY, JR., Md.	
Liquid Fuels.	
JOHN A. BENSEL, N. Y.	
PRESCOTT BUSH, N. J.	
Dynamometers (Experimental Investigation).	
ALLEN W. BRAINARD, N. Y.	
VICTOR DE MACKIEWICZ, N. Y.	
Steam Pumping Machinery.	
WILLIAM BRISTOL, Conn.	
A new Double Acting Gas Engine (Original Design and new Invention).	
LAFAYETTE D. CARROLL, Va.	
Compounding a Beam Engine ("Macnaughting." (Original Design).	
WALTER CARROLL, La.	
Inertia of Reciprocating Parts of Engines (Mathematical Investigation).	
E. L. DENT, Washington, D. C.	
The American Locomotive Engine (Theory and Current Practice).	
ADOLPH FABER DU FAUR, JR., N. J.	
Safe Construction of Plain Cylindrical Boilers (Theory and Design).	
E. H. FOSTER, N. J.	
KENNETH TORRANCE, N. J.	
Steam Boiler Explosions (Theory. New Determination of Stored Energy).	
F. W. FOSTER, N. Y.	
Development of the Locomotive.	
CHARLES L. GATELY, Conn.	
ALVIN P. KLETZSCH, Wis.	
Steam Engine Efficiency (Experimental Determination of Wastes, and Law of their Variation).	
HENRY L. GANTT, A. B. (John Hopkins Univ.), Md.	
DABNEY H. MAURY, Va.	
Steam, Ether and other Vapors compared as Working Substances in Heat Engines (Original Calculations of Efficiency of the several Fluids).	
DAVID S. JACOBUS, N. J.	
EDWARD B. RENWICK, N. J.	
Mechanical Refrigerating Machines (Theory and Experimental Determination of Efficiency).	
WILLIAM L. LYALL, N. Y.	
Jute Manufacture and Machinery.	
HENRY J. MILLER, N. J.	
Safety Valves.	
A. SAUNDERS MORRIS, Pa.	
H. R. REA, Pa.	
Manufacture of Cane Sugar (Experimental Determination of Power).	
CHARLES F. PARKER, N. Y.	
WILLARD S. TUTTLE, N. Y.	
Cable Railways (Construction and Costs).	

HARRY DE B. PARSONS, B. S. (Columbia College), N. Y.
Systematic Method of Ship Design (Theory of New System).

WILLIAM H. PEIRCE, Md.
Friction of Single and Compound Engines.

HENRY S. PRENTISS, A. B. (Princeton College), N. Y.
Thermo Electricity in Engineering.

GEORGE J. ROBERTS, Va.
The Joy Valve Gear.

GEORGE F. SANDT, A. B. (Lafayette College), Pa.
Design of a new Suspension Foot Bridge.

GEORGE M. SINCLAIR, A. B. (Princeton College), Pa.
Propulsion of Balloons (Present Status and Promise).

CHARLES W. THOMAS, N. J.
Eccentric and Valves of Steam Engines (Comparison of Existing Types).

BENJAMIN W. TUCKER, N. J.
The Armstrong and Sims Engine (Construction and Theory).

FRANK VAN VLECK, N. Y.
Cams (Systems and Kinematic Theory).

JOHN VAN VLECK, N. Y.
Reaction Wheels (Theory and Original Design).

CHARLES W. WHITING, Pa.
Hoisting Machinery (Review of Apparatus for Deep Shaft).

ALEXANDER WURTS, Ph. B. (Sheffield Sci. School), Conn.
Energy and the Steam Engine (Traces Energy passing through Boiler and Engine).

Honorary Degree of Mechanical Engineer, conferred upon Prof. CLARENCE A. CARR, Assistant Engineer, U. S. N.

The E. G. Soltmann Prize in Mechanical Drawing, awarded to Mr. HENRY ABBEY, Class of '85.

For commendable work in the Department of Mechanical Drawing, during the Junior year, students THOMAS G. SMITH, HARVEY D. WILLIAMS and OTTO PFORDTE, deserve honorable mention.

The Priestly Prize in Chemistry has been awarded to Mr. OTTO PFORDTE.

In connection therewith, the following gentlemen have received honorable mention: Mr. W. J. BROADMEADOW, Mr. EDWIN BURHORN, Mr. CLAYTON A. PRATT, Mr. THOMAS G. SMITH.

The Wm. A. Macy Prize has been awarded to EUGENE H. KIERNAN.

RECEPTION COMMITTEE.

WM. S. DILWORTH,	A. G. GLASGOW,
J. H. STEWART,	PAUL WILLIS,
O. H. BALDWIN.	R. H. RICE,
W. A. ADRIANCE.	

As usual, the "Distinguished Visitor" did not appear. The Salutatory and Valedictory addresses reflected great credit upon the speakers.

The floral gifts were beautiful beyond description, prominent among which was a magnificent and most perfect representation of an eccentric for Mr. Parker, in his double office of Salutatorian and *Eccentric* editor, and also a handsome ship for Mr. Rea.

Although this church is much larger than

any place where Commencement has been held heretofore, and every precaution was taken to avoid a crowd, yet the place was literally jammed and many were unable to obtain an entrance.

After the exercises were over, the Alumni held their annual reception and collation in the German Club hall. Mr. Wm. H. Blaikie, who was invited to be present, spoke a few words relative to the needs of a gymnasium, and endeavored to persuade the Alumni to assist the students in establishing one.

Thus ended the memorable twelfth Commencement.

LECTURE ON THE MANUFACTURE OF STEEL AND IRON.

Delivered by Wm. Kent, M. E., to the Senior Class of the Stevens Institute of Technology, March 27 1884, under the auspices of the Dept. of Experimental Mechanics.

The subject matter was presented by Mr. Kent in the form of answers to questions, suggested to the minds of the students during the annual visit to prominent metallurgical establishments.

Question: We have seen the crucible steel process in Jersey City, the Bessemer process at Bethlehem, Pennsylvania, and the open hearth process at Midvale Steel Works, Philadelphia. Can each process produce all the various grades of steel at present in use in the trades?

Answer: The crucible can produce all qualities of steel which are used in the trades except the softer qualities, which are very low in silicon and carbon. At the high heats necessary for making soft steel the steel is apt to absorb both silicon and carbon from the crucible, and consequently there is more difficulty in producing the softer kinds.

The Bessemer process is capable of producing nearly all qualities of steel, provided that raw material of sufficient purity can be obtained, and provided, also, that by extreme care in manipulation the bath before or after pouring can be freed from the presence of blow holes and oxide and iron. The Bessemer process is ordinarily used to produce the commoner grades of steel, leaving the very finer, such as fine tool steels, to be produced in the

crucible; but considerable success has been reached in the manufacture of tool steels in Sweden, where the raw material is of extraordinary purity, and the converters are much smaller and run with lower pressure of blast than in this country. It would not be possible by the Bessemer process, as at present used, to produce from American ores the finer grades of tool steel.

The open hearth process is probably capable of making all grades of steel. The open hearth is practically a large crucible. In practice, however, the open hearth has not yet been used to any great extent in producing the finer grades of tool steel, although a number of qualities of steel, such as spring steel and cutlery steel, which were until recently made by the crucible process alone, are now made in the open hearth. At one works in the United States, the Bolton Steel Company of Canton, Ohio, the open hearth process is used to produce tool steels of good quality, and it is probably that in future those tool steels, for which there is a large market, will be largely made in the open hearth.

Q. What are the relative advantages of the crucible process, open hearth and Bessemer processes, especially as to the element of cost?

A. The chief advantage of the crucible process is that it is especially adapted for the production of small masses—that is, for cases in which only a small quantity is desired of a particular quality. A large proportion of the tool steels are used in very small quantities, and orders for such steels are always figured in pounds and not in hundred weights or tons. Since the product of a single cast of open hearth or Bessemer is always more than a ton, there will be a considerable loss in using this process for making steels for which the market is very limited, and the risk of making a heat which should not be exactly of the quality desired would be of much more serious importance than the risk of losing the contents of a crucible.

The disadvantages of the crucible process are chiefly high costs, due to cost of crucibles, large amount of labor required in the process, and relatively large consumption of fuel, besides the inability, already spoken of, to make steels very low in carbon.

On account of the expensive character and cost of plant required to make a small product by the crucible process, as well as on account of other disadvantages already spoken of, the crucible process, must always be confined to the manufacture of the higher priced steels,

which are used only in small quantities. It would be utterly impracticable to build crucible works enough to supply the market for steel rails.

The principal advantage of the Bessemer process is the cheapness in cost of its product, the cost of fuel, labor, repairs and interest on plant being of less than those of any other process. Consequently it is the favorite process for the cheaper steels.

Another advantage of the Bessemer process is the fact that it, when taken in connection with the blast furnace, works directly from the native raw material—that is, iron ore—and the cost of raw material for it, therefore, is limited only by the cost of mining and transportation, while the crucible and open hearth processes depend for their raw material upon manufacture iron or scrap, the supply of which may be limited by the conditions of the market. The disadvantage of the Bessemer process is the difficulty of regulating the percentage of carbon, especially in the low carbon steels, with such extreme nicety as in the open hearth and crucible processes, and therefore for finer grades of steel the Bessemer process is not quite as well adapted as the other two processes.

The open hearth process holds an intermediate ground between the Bessemer and the crucible processes. It has the advantage common to the Bessemer process of cheapness in cost due to the handling of large masses, and much smaller cost of fuel and repairs than the crucible process. It has the advantage over the crucible process of certainty of quality of product.

The disadvantages compared with the Bessemer are slightly increased cost of plant for a given product, and the increased cost of product due to higher price of raw material.

The production of open hearth steel also is generally limited by the quantity of scrap steel to be found in the market. Open hearth steel may be made from pig and ore without the use of scrap, but this process in the past has generally been found rather more expensive than the scrap process. It does not seem likely at present that the open hearth process will be greatly developed in the future for the cheaper steels, since the Bessemer process, when taking metal direct from the blast furnace, is likely always to be the cheaper process, but it is quite likely that the open hearth process will be used more and more as a substitute for the crucible process.

An idea of the relative growth of the three

processes may be given from the following figures of production in the years 1872, 1877, and 1882, the figures being in tons of two thousand pounds :

Years.	Bessemer Steel Ingots Tons.	Crucible Steel Ingots. Tons.	Open Hearth Steel Ingots. Tons.
1872.....	120,108	29 260	3,000
1877.....	560,587	40,430	25,031
1882.....	1,196,450	85,089	160,542

Q. How do the Bethlehem Bessemer Steel Works compare with other steel works of the country ?

A. In some respects the Bethlehem Steel Works differ from all other works, first, from the fact that the whole process from the melting of the iron in the cupola to the finishing of the rail is carried on in one building. The mill building itself is one of the finest in the world.

Another difference from other works is, I believe, that it is the only one in which the transfer ladle system is used between the cupolas and the Bessemer converter, except those works in which the metal is brought direct from the blast furnace by means of a locomotive. In all the other Bessemer steel works the cupolas are set at a higher level, and the metal is run through inclined runners from the cupolas into the converters. The general arrangement of each pair of converters, with its semicircular pit surrounded by top supported hydraulic cranes and three-high Fritz blooming mill, the Siemens furnace, for ingots and blooms, and the three-high rail mill, with the cooling bed and the straightening and punching presses, are the same as at nearly all the other American mills. The new blooming mill now being erected at Bethlehem is, I think, the largest three-high blooming mill in the world, and I think the engine is the largest engine in this country attached to a rolling mill. When the Bethlehem works were first built they had only two converters, the other two having been added within the past two years. The universal American arrangement prior to 1880 was two converters, and the product of two converters was increased from 10,000 tons per annum in 1868 to over 14,000 tons per month in 1880. By this time the limit of capacity of the two converter plant seemed to be reached, and various works have adopted different arrangements, as follows :

CONVERTERS USED.

	March, 1880.	July, 1882.
Bethlehem Steel Works.	two 7 ton	four 7 ton
Edgar Thomson Steel Works	two 7 ton	three 10 ton
Pennsylvania Steel Co..	two 6½ ton	{ two 7 ton and three 8 ton
Cleveland Rolling Mill Co.	two-6 tons	two 10 tons
North Chicago Rolling Mill Co.....	two-6 tons	{ two 6 tons and three 10 tons

It is too early yet to say what will be the arrangement of the future plant. There will probably be a struggle for supremacy between the four 7 ton, the three 8 ton and the two 10 ton and the three 10 ton converter plant as to which can turn out the greatest tonnage with the less cost for labor and maintenance. The lecturer here read an extract from a letter on improvements in Bessemer steel works, which he wrote for the *Bulletin of the Iron and Steel Association* in November, 1882, as follows :

“Other changes of works besides that of re-arrangement of converters have taken place, the chief among them being the taking of the metal direct from the blast furnace, the use of two-high reversing mills for either blooming or rail rolling, and the direct rolling of the rail from the ingot without shearing or reheating the bloom. The Cambria works have adopted the two-high reversing blooming mill, and the South Chicago works have adopted a two-high reversing rail mill while retaining the three-high blooming mill. In the three-high blooming mill itself an important improvement has been adopted at several works, viz.: the making stationary of all three rolls, instead of having the middle roll move up and down, as formerly. Heavier drafts are thus taken; the bloom is made from the ingot in fewer passes (usually 12), and the mill is simpler in construction and more easily kept in repair.

“Perhaps the farthest departure from the old methods of Bessemer works has taken place in the erection of the new works of the North Chicago Rolling Mill Company at South Chicago, Illinois. They exhibit the nearest approach to a “direct process” which has yet been reached in steel making, as well as the most complete substitution of machinery for manual labor. The plant consists at present of four blast furnaces, three 10 ton converters, four Siemens heating furnaces, one blooming mill and one rail mill, with the necessary equipment, of course, of spiegel cu-

polas, ladles, cranes, pumps, rail saws and other finishing apparatus.

"The first impression the works are apt to produce upon a visitor who is familiar with the appearance of the oldest Bessemer works is one of surprise at the smallness of the plant. This surprise is likely to be increased when he learns that these works have a capacity beyond that of any two-converter plant ever built, although they occupy less ground, have dispensed with a large portion of what was hitherto supposed to be necessary equipment and machinery, and employ a far smaller force of men. The chief features which distinguish these works from all former American Bessemer works are as follows: Their use of pig metal direct from the blast furnaces in the melted state, thus dispensing with the casting and breaking of pigs, and with the cupolas for remelting them; the rolling direct from the ingot into the rail without reheating, thus dispensing with the cutting of the ingot into rail blooms and reheating them; and the use of a two-high reversing mill with automatic feeding tables for rolling rails, thus dispensing with the array of men usually seen about the rail rolls.

"It is a little surprising that the first of these improvements, namely, the using of metal direct from the blast furnace, should not have been adopted in this country years ago, since it has been a successful feature of some foreign works for many years. Nearly all the improvements that have been made in Bessemer practice since 1865, including Holley's arrangement of plant and his movable converter bottoms, the use of top supported hydraulic cranes, the three-high blooming mill with the Fritz feeding tables, and a great variety of minor details especially facilitating rapid production, by which the product of each American converter has been made to average from two to four times that of the foreign, have been made upon this side of the ocean. The English and Continental works have hitherto been slow in adopting our methods, and we have generally depreciated the merits of theirs. Each country now seems more willing to adopt the best ideas of the others, and so we find the latest English works built after a study of the American, and the latest American works adopting some of the methods of the English.

"The blast furnaces of the South Chicago works are each 75 feet high by 21 feet diameter of bosh, are provided with fire-brick hot-blast stoves, and are thoroughly modern in

every other respect. The melted pig iron is tapped from them into ladles set on small trucks, which are drawn by a locomotive to the converter house, and are there lifted to the level of the converters. The crane ladle, which receives the steel from the converter, is transferred from one crane to another, the second reaching to the ingot pit, which is thus enabled to be set at a greater distance from the converters than is possible in the old plants, which have but one ladle crane.

"When the ingots are cool enough to be stripped, or taken out of the moulds, their interior being still liquid, they are removed to the Siemens furnaces, where in about half an hour their exterior is heated and their interior is cooled so that the ingot is of a uniform heat throughout and is then fit for rolling. These furnaces each have a bed 24 feet long by 8 feet 4 inches wide, and are large enough to contain about 15 ingots at a time.

"The heated ingot is taken on a buggy to the feeding tables of the blooming mill, which is of the ordinary three-high Fritz pattern, but is of great size and strength, having rolls 40 inches in diameter and the middle roll stationary. Only eleven passes are given the ingot in this mill, and, as the rolls are run at a speed of over 50 revolutions per minute, the time required for blooming is unusually small. The bloom as it leaves the last pass of the blooming mill is at once taken with the speed of a railroad train over a series of feeding rollers to the rail rolls, about 200 feet distant, and is there entered. The rail mill is two high, 26 inches in diameter, and is driven by compound reversing engines. Seven passes in this mill complete the rail, which is over 120 feet long, or four rail lengths. Another set of feeding rollers carries it in front of the hot saw, which saws it into the four lengths. An ingenious device, a revolving stop, is used for stopping the end of the rail at the proper distance from the saw, to insure each piece being cut to the right length. The first piece, being the hottest when cut, is cut a little longer than the second; this is cut a little longer than the third, and so on, so that the contraction of each will equalize the lengths when cold."

The Edgar Thomson Steel Works have recently adopted the direct process of taking the fluid metal from the blast furnaces without remelting in cupolas. The Cambria Iron Works are preparing to do the same, and it is probable that this direct process will be the process of the future.

A more recent improvement is the substitution of what is known as the soaking pit for the regenerative furnace for the heating of ingots. This soaking pit is simply a hole in the ground lined with fire brick, into which the ingots are placed immediately after being stripped from the moulds. The interior of the ingot being still liquid, and the fire brick walls having previously been heated, an equalization of temperature takes place, by which the inside of the ingot is cooled and the outside heated until the whole ingot becomes of a uniform white heat, just ready for rolling, without the expenditure of any fuel as in the heating furnace. By this system of heating ingots in connection with the system of rolling adopted at South Chicago, and the direct process of taking metal from the blast furnace, the only fuel necessary in the Bessemer process for making steel rails directly from the ore need be the fuel used in the blast furnace, since the waste gases of the blast furnace and the waste heat from the Bessemer converters should be more than enough to furnish all the steam for the engines of the blast furnaces and of the Bessemer mill.

The utilization of the waste heat of the Bessemer converter, however, is not yet attempted in practice, and at all works thus far built some of the boilers are fired with coal, with the exception, perhaps, of the Edgar Thomson Steel Works, in which the boilers are fired by natural gas.

Q. Can you give an idea of the probable extent to which the puddling process will be superseded in the future by Bessemer and open hearth processes?

A. There is scarcely any doubt that before many years the product of the puddling furnace will be very largely superseded by that of the Bessemer and open hearth processes. There is scarcely any purpose in the arts for which puddled iron is now used for which open hearth and Bessemer steel is not better, with the single exception of those pieces and structures in wrought iron which require to be welded in an ordinary blacksmith's fire. At the present time iron is generally welded with more facility than steel, although steel is now being made which can be welded with a considerable degree of success when special furnaces or apparatus is used, or even in an ordinary furnace by a skilful blacksmith.

The question of relative cost of the two is now the only barrier to the rapid substitution of steel for iron. At the present time most structures can be made at a lower price per

pound in iron than in steel; but as the steel works are rapidly improving their machinery so as to cheapen their product, Bessemer steel is likely soon to be cheaper than puddled iron. Steel rails can already be made much cheaper than iron rails, and it is only a question of time when the proper machinery is introduced, when a large number of other steel products will be cheaper than iron ones.

The following figures were given two years ago by Messrs. Thomas & Gilchrist, the English inventors of the basic steel process, of the comparative cost of manufacture in England of puddled iron and of basic steel, the figures being changed into American money:

	Price per ton.	Pounds.	Cost per ton of Pud- dled Bar.	Price per ton.	Pounds.	Cost per ton of Ingot.
Labor			\$3.29			\$0.85
Coal	\$1.34	2,464	1.47	\$1.34	604	.30
Coke				3 05	84	.12
Ingot molds .....						.21
Lime					403	.44
Fettling	4.07	560	102			
Ferro manganese				73.20	11	.36
Refractories .....			.13			.81
Stores and repairs .....			.49			.49
Interest and re- demption at 10 per cent .....			.24			.24
General expenses, royalty, etc. ....			.61			1.10
Total conversion costs			\$7.25			\$4.92
Waste	10.25	168	.77		392	1.79
Total costs, in- cluding waste ..			\$8.02			\$6.71
Cost of pig			10 25			10.25
Cost of ingot or puddled bar			18 27			16.96

In June, 1882, I wrote to the *American Manufacturer* concerning the paper of Messrs. Thomas & Gilchrist (read before the Iron Institute of Great Britain) as follows:

"It is full not only of details as to the work and the technical success of the process, but of estimates of its cost and chemical analysis of the product, and what I think most important of all, a strong argument in favor of the early substitution of basic steel for the product of the puddling furnace. I know Messrs. Thomas & Gilchrist's views, and those of other writers who predict the early extinction of a large majority of the old fashioned

puddling furnaces, will be received with incredulity by many American iron masters. They will point to the failure of all the similar predictions which have been made during the past five years, and to the fact that, in spite of such predictions and of the rapid rise of the Bessemer process in the United States, there never was such a large demand nor such a heavy production of ordinary puddled iron, both in the United States and in England, as during the past two years. But I think the views of Messrs. Thomas & Gilchrist are correct; and I intend to keep repeating the prediction until its final fulfilment.

"The only uncertainty about the matter is the exact date when it will take place; but all the signs of the times point to a very early day.

Do not misunderstand me: *all* the puddling furnaces will not become extinct within the next half century. As the Catalan forge has been supplanted by the puddling furnace for more than one hundred years, yet still is making about as much iron as it did thirty, fifty or a hundred years ago, so will the puddling furnaces remain in operation long after the Bessemer and open hearth processes together shall be making the great bulk of the iron and steel products of the world.

"I think it quite safe to make the prediction that the year 1882, or perhaps 1881, will be the year of maximum production in the United States of finished puddled wrought iron, exclusive of the wrought iron which is used as a material for certain steel purposes." The latter prediction has thus far been fulfilled. The year 1881 showed the maximum production of roll iron 2,643,927 net tons. In 1882 there was made 2,493,831 net tons. I have not seen the figures for 1883, but believe they will be even less than those of 1882.

In 1881 the product of steel of all kinds was 1,778,912 net tons, and in 1882, 1,945,05 net tons, or more than twelve times the total steel product of 1872 (160,108 tons). The production of rolled iron in 1872 was 1,847,922 net tons. Thus, while the production of iron in ten years increased less than 36 per cent., the production of steel in the same time increased more than 1,100 per cent.

Q. Are mechanical puddling furnaces, and especially the Danks furnace, likely to retard the substitution of iron for steel?

A. I think not. The mechanical puddling furnaces have generally been failures. The Danks furnace is the only one of these which has at all been successful in the United States, and that is now employed on a large

scale only in one works—that of Messrs. Graff, Bennett & Co., in Pittsburg.

An account of the Danks furnace may be found in the *Metallurgical Review* of 1877, and in the transactions of the Engineer Society of Western Pennsylvania.

I saw a mill in Cincinnati in the summer of 1882, in which the Danks furnaces were in operation, but the works failed subsequently, and I believe are not now running.

In October of that year, in a letter to the *Bulletin of the Iron and Steel Association*, I wrote as follows concerning the Danks furnace:

"The theoretical obstructions to the improvement of the puddling furnace have been much less serious than the practical obstruction which has only been learned by costly experience, namely, that it is extremely difficult to build and to operate a mechanical puddling furnace which shall work so successfully that the losses consequent upon imperfectly worked iron, upon expensive and frequent repairs, upon stoppages and irregularity of working of furnaces, and upon greater interest in cost of plant, are not found out at the end of a year's running to have overbalanced the saving in fuel or in wages of workmen. This has been the real trouble with mechanical puddling furnaces; with but rare exceptions, they have proved commercial failures. They did not for any long period of time make iron cheaper or better than old fashioned furnaces. Even the Danks furnace, which is certainly a success in two establishments in the United States, is only a partial exception. The failures with it have perhaps been more extensive than with any other mechanical puddling furnace. The writer well remembers that about five years ago he mentioned to a gentleman, who he was not then aware knew anything about the Danks furnace, some facts he had learned concerning the results of its work in Pittsburg. The gentleman replied: 'I don't want to hear anything about the Danks furnace. I have had \$175,000 worth of experience in it, and don't want any more.' Since that letter was written the Danks furnace has been introduced into the Otis Steel Works at Cleveland, not for the purpose of making rolled wrought iron, but dephosphorizing pig iron and converting it into a bloom of exceedingly fine quality as regards freedom from phosphorus, which is used as a raw material in the open hearth steel furnace for making the finer grades of steel.

Q. Are steel castings likely to replace wrought iron to any great extent?

A. Probably only for certain forgings which it is cheaper to make in steel castings than of wrought iron. Steel castings are, however, being largely used to replace cast iron, especially for parts of machinery requiring great strength, such as gear wheels, rolls, pinions, etc. A number of steel casting establishments have been started recently, which make steel in an open hearth furnace, and they are said to be meeting quite a large market for their products, and are making them of excellent quality. The Pittsburg Steel Casting Co. has made most of its steel castings in the crucible, but has recently added a Bessemer converter for large castings. Other works make their castings by melting some special qualities of cast iron in the cupola, and removing the carbon from the castings so made to the point desired in the steel by annealing in boxes of oxide of iron.

Q. What is the benefit of gaseous fuel in the iron and steel manufacture?

A. Gaseous fuel is chiefly used for heating furnaces and for melting steel. For the former purpose its advantage is a saving of fuel from the ordinary coal fire furnace, also a saving in waste of iron in the furnace, due to greater control of the quality of the flame by the melter.

For steel melting in crucibles it offers a great saving of cost over coal firing, and it is indispensable to the success of the open hearth process, for it has not been found practicable to generate and maintain the necessary heat for this process by any other means than by the use of gaseous fuel in connection with the Siemens regenerative furnace. The economy of fuel, when gaseous fuel is used, comes chiefly from the use of the Siemens furnace, which does not discharge the waste gases of combustion into the chimney until they have been reduced in temperature to about 400 degrees, while in ordinary furnaces, such gases escape at as high temperatures sometimes as 2,000 degrees, and moreover frequently escape before they are thoroughly burned.

Q. The students have seen the Sellers 7 ton hammer at the Midvale Steel Works. Are there any larger hammers in this country, and if so, what are they used for?

A. The largest hammer in this country is a 17 ton hammer at the works of Park Bros. & Co. in Pittsburg. It is used for making heavy forgings, such as shafts for marine and other engines, and also for hammering steel ingots into blooms to be rolled in the rolling mills. In

this case, the large hammer takes the place of a blooming mill, such as the students saw at Bethlehem.

Q. What effect would the adoption of free trade have upon the iron and steel manufacture of the United States, and what are the chief reasons against its adoption as regards that manufacture?

A. It would be disastrous in the highest degree. I can perhaps answer the question best by referring to the figures I have already given as to the cost of puddled iron and of basic steel in England. In that table the cost of puddled bar in England is given at \$18.27 a ton. I do not believe that puddled bar has ever been made in this country at a cost of less than \$30 a ton, and when it was sold in Pittsburg five years ago as low as \$34 a ton, a large number of the works had to stop running.

The cost of ingot steel in England by that table is less than \$17 a ton. The lowest price that steel rails have ever been sold at in this country is the price at which they have sold during the past few weeks, namely: \$34 per ton; and the ingots must have cost not less than \$28 per ton. A few months ago several of the Bessemer mills stopped running because they could not make steel rails at the prices then prevailing.

The cost of pig iron is given in the English table at \$10.25 a ton. The lowest price at which No. 1 pig iron ever sold in Philadelphia was \$16.50 a ton—in November, 1878. About the same time in Pittsburg the lowest price for Bessemer pig iron was \$19, and this low figure has never been touched since.

When these figures prevailed more than half the blast furnaces in the country were out of blast because it was impossible to run them at a profit.

The reasons why pig iron, rolled iron and steel cannot be made and sold in the United States as cheaply as they can in England are: First, In the geographical location of the ores relative to the fuels, the United States is greatly at a disadvantage. Pittsburg is the chief centre for the manufacture of finished iron and steel in the United States. The fuel for its pig iron, Connellsville coke, is carried 60 miles; but the nearest ore suitable for Bessemer steel purposes is at Lake Superior, and at all times during the past five years the supply of Lake Superior ore has been so limited in Pittsburg that it has been found necessary to transport ores more than 4,000 miles from Spain, Algiers, Elba and England.

Second. The higher interest on money makes the interest charges on iron works greater in America than in England.

Third. The higher prices of labor in the United States.

When I visited Europe two years ago the wages paid to the lowest class of laborers in an iron works in Pittsburg was a dollar and a quarter a day. The same class of labor in an iron works in Glasgow, Scotland, was paid sixty-two cents per day, and at the Cockerill Iron Works in Seraing, Belgium, one and a half francs or thirty cents per day. In the Cockerill Works large numbers of women were employed who hauled in small carts around the works fuel, ashes, and other materials. In order for the workman to support his family in Belgium, it is necessary for his wife to work in the mill with him. I think Mr. Abram S. Hewitt, in his report of the Paris Exposition, in 1867, says that the condition of the continued existence of the iron manufacture in France and Belgium is that the laborer eats meat only once a week. If absolute free trade in iron products were adopted in this country, the condition of the existence of the iron manufacture in this country would not only be that the laborer should eat meat once a week, but that the rate of interest on money should be as low as it is in England, and that the cost of transportation from our great distances between ores and fuels should be reduced to an equality with the cost of transportation of ores to fuels over very short distances in England.

Mr. Isaac Louthian Bell, member of Parliament, in a report of a visit he made in this country in 1876, showed clearly that the distances the ores and fuels had to be transported in this country was a permanent disadvantage under which the United States labored, and that in this respect it could never compete with Europe.

The iron trade of the United States in all its branches is now such an exceedingly important branch of our industries, and such a large portion of our population depends upon it for subsistence, including the laborers engaged on our railroads in transporting its raw materials and products, the farmers who supply food to the laborers engaged in it, and all the population which is indirectly dependent upon these trades, that if it were possible to wipe out of existence any considerable portion of the iron trade, it would be followed by a commercial revolution such as the world has never seen. If any of you students believe that free

trade is going to be the policy of this country, I would advise you not to become mechanical engineers, but to become lawyers, for if free trade is adopted the legal profession will be the most lucrative, and will find its chief employment in matters connected with sheriffs' sales and bankruptcies.

But if, as I believe, free trade is not going to be adopted, and you are going to become mechanical engineers, there is no better field for the exercise of your profession than the iron and steel industries.

In conclusion, I will read something I wrote three years ago concerning the status of the mechanical engineering profession with reference to the manufacture of iron and steel (*American Engineer*, Aug. 1881):

"Considering the present status of metallurgical engineering in this country, we must say that it occupies as advanced a position, and presents as many triumphs of invention and skill, as any other branch of engineering in any country, civil, mechanical, naval or military, and the means by which it works to overcome the resistances of nature by the least expenditure of time, labor and capital, are as nearly perfect as any branch of engineering can show.

"The blast furnace is a marvellously perfect apparatus for converting the crude ore into pig iron. The Bessemer converter is nearly as perfect for converting the pig iron into steel. The open hearth, destined to be coexistent with the Bessemer converter, is in rapid process of development, and bids fair to make any grade of product, from the lowest to the highest, in carbon. The old direct processes, such as the Catalan, the puddling process, and the crucible steel process, still have their place, and will have it, although diminishing in relative importance, just as the sailing vessel coexists with the more modern steamship, as the stagecoach coexists with the locomotive.

"But great as have been the achievements of the past, the work of the metallurgical engineer is far from being ended, and we have no doubt the next ten years will witness additions to his triumphs, although not so great, perhaps, as the invention of the pneumatic process (misnamed the Bessemer—it should be the Kelly) and the basic process (Thomas-Gilchrist, Reese, Snelus, or Riley). The open hearth process remains to be perfected. The use of steel for castings needs to be extended. Great improvements are possible in the methods of rolling, or otherwise shaping the ingot into the finished material. Economy of

handling material in rolling mills, economy of steam, and a number of minor economies still offer problems for the solution of the metallurgist of the future.

"Here the line of division, if any ever existed, between the mechanical and the metallurgical engineer vanishes. It is now entirely to the mechanical engineer that we must look for all future developments in the manufacture of iron and steel.

A TRUE STORY.

Dick Hathaway and I had been chums ever since we made each other's acquaintance, some fifteen years ago.

We both lived in the town of Franconia, in New Hampshire, and many were the fishing and hunting excursions which Dick and I made together in the mountains about our home. In fact, we were more like brothers than mere acquaintances, and so when my parents decided to send me to Stevens, to study for an engineer, it was not at all strange that Dick should accompany me.

Dick immediately became popular among the boys, for he was an adept in all athletic sports, and they welcomed him as a valuable addition to the foot ball and base ball teams. He was a good student, too, and in the evenings we used to sit in our study and get out our lessons together, and when these were done we would discuss the latest foot ball or base ball matches.

And so we "pursued the even tenor of our way" through the Freshman, Sophomore and Junior years, and entered on the Senior. For some time before the Christmas vacation I had noticed that something ailed Dick. His face, which had always been so cheerful and full of color, now looked careworn and pale. His manner, too, always so full of good humor, had changed, and in place of gathering the boys about him by his amusing stories, he now seemed to avoid them, and when any one spoke to him, he answered in monosyllables and in a startled kind of a way.

I did not question him about this change, for I thought it was only the effect of hard study, and supposed that after visiting home for the holidays, he would come back with all of his old time cheerfulness.

It so happened that I was not going home that Christmas, but was to visit some friends in Pennsylvania, and so after giving Dick some

messages for my friends at home, I parted from him for two or three weeks.

When we came back to commence the second term I was surprised, not to say shocked, by the change which had taken place in Dick in so short a time. His health, in place of growing better had grown worse, and now one would scarcely have recognized him as the fellow who had electrified everybody by his brilliant playing on the foot ball field not three months since.

Of course, I could not understand it, and so one night when we were seated before the grate fire in our study, I said to him:

"Dick, what in the mischief has got through you lately? You are not the same fellow you used to be at all. You remind me now of one of Poe's cheerful subjects, or Dickens' haunted man. What's the matter with you anyhow?"

At the mention of the word haunted, Dick turned upon me quickly, almost fiercely; but restraining himself, said with a bitter smile, "Yes, I guess I am haunted."

Neither of us spoke for some time after that, but sat watching the sparks fly up the chimney, and listening to the wind whistling round the building and the snow beating against the windows.

I confess I was somewhat alarmed at his strange answer, and was about to ask him what he meant by it, when he turned to me and said:

"Frank, old boy, I've never kept a secret from you yet and I don't mean to now. I have never told this at home, partly for fear of being laughed at, and partly for fear that they would not let me come back; but I'll tell you now what has caused this change.

"You know just before the ending of last term Professor Thurston announced that we must design a turbine. I didn't think much of it then, although I always despised drawing. I started on an inward flow wheel, and had almost finished it when one of the fellows came along and told me that Professor Thurston was not going to accept any inward flow wheels. That rather disheartened me, but I threw away that design and started on a parallel flow. I got along on that all right until I struck the regulating apparatus. Some fellow told me we had to make an original design for that. There was where all the trouble commenced. I thought over that thing till I was almost crazy. At last in despair I put in several cog wheels and a cover to regulate it by and handed it in.

"When I was coming out of Professor Thurs-

ton's room I met one of the fellows, who asked me if I had handed in my turbine. I said I had, and then he asked me how I had regulated it. I told him, and he then set about convincing me that that would never work. He ended up by telling me that he had heard that Professor Thurston was not going to accept any parallel flows, but only inward flows.

"No one has ever accused me of being vindictive, but I felt like killing that fellow then and there.

"The more I thought of that turbine the worse I got. I grew morose and sullen and didn't want to see or speak to anybody. I dreamt of it by night and heard the splash of water by day. When I ate my meals I tried mentally to figure out the efficiency of that infernal thing.

"Then the holidays came and I started for home. As I walked up Broadway to the Grand Central Depot all the shop windows appeared to be filled with turbines; people appeared to be buying turbines and carrying them home for Christmas presents.

"When I got to the depot I bought my ticket and said to the ticket agent:

"What time does the turbine start?"

"He evidently thought I had been a little previous in celebrating Christmas, so he answered in a kind tone:

"You mean the train, I presume. That starts at 11.05."

"I looked a little confused when he corrected me, but took my ticket and started for the baggage room. As I passed the news stand I glanced at one of the engineering papers lying on it, and saw in large letters the heading 'A New Form of Turbine.' I had a strange desire to buy that paper and then viciously tear it to pieces, or else do something to put it where others could not get at it.

"I walked on, however, pondering on what form of turbine that new one might be. When I reached the baggage room I showed my ticket and said:

"Please check my turbine to Franconia."

"The baggage master looked at me for a moment and then replied:

"Say, what are yer givin' us? Do yer take me for a chump?"

"I didn't know what he meant at first, but suddenly I remembered what I had said. Then I gave him a quarter and told him that 'turbine' was the French for 'trunk,' and that I had been in France so long that I had become rusty on English.

"Do you remember how when we used to go

home together I would sit in the car and whistle tunes, and the car wheels would keep time? Well, as I sat there going home this time the car wheels seemed to keep saying, 'Turbines, turbines, turbines, parallel flow, parallel flow,' till I was almost wild.

"At last I reached home, and for the next two or three hours I forgot my troubles; but when I went up to my room to prepare for dinner and was alone for a short time, they all came back again. I went down to dinner in a dazed sort of way and scarcely heard any of the conversation that was going on about me. I remember, however, hearing my mother say:

"This steak is not cooked enough. That cook is the least efficient one I have ever had."

"Is she parallel or inward flow?" I asked, 'because if you want her to be efficient you must make alpha equal to twenty degrees and beta.'

"Just then I looked up and observed the surprise depicted on everybody's face, and stopped.

"After dinner all the folks expressed regret that you were not coming home that week, and my mother asked me why I didn't invite George Richards to come and stay a week. I thought this was a good idea, and went upstairs and wrote a note requesting him to come and stay with me. The next day the note came back, and on it was written 'Is this intended for me?' I read it over again and found I had written as follows:—

"MY DEAR GEORGE—In parallel flow turbines, in order that the water may work to the best advantage, it should enter the wheel without shock and leave it without whirling motion; for which purpose the velocity of whirl on first entering the wheel should be equal to the first circumference of the wheel, and the velocity of whirl relatively to the wheel on leaving the wheel should be equal and contrary to that of the second circumference of the wheel. Don't forget.

Yours, very truly,

DICK HATHAWAY.

"In short, Frank, that was the way things went during my stay at home, and I was anxious to get back to college, for I thought that when I got back among the boys I might forget these things. But no such good luck was in store for me, for I had hardly put my foot inside of the Institute door when one of the fellows came up and said, 'Hello, Dick, got your turbine designed yet?' I didn't say anything; I just turned around and came home and waited till you came. There,

Frank, you have the whole story. I suppose you think I am foolish, but I can't help it. That thing has been preying on my mind the last six weeks, and I feel reckless now and don't care what becomes of me. Good night, Frank."

I said good night, and then sat at the fire for some time thinking of how I could rid Dick of his strange hallucination. I resolved finally to talk to him in the morning and see if I couldn't cheer him up. I didn't think then that when Dick bade me good night it was the last time he would ever speak to me; but when I went in his room in the morning to call him he was dead. Even in death his face bore the same careworn look of the past six weeks, and I have no doubt that he must have been thinking of his turbine up to the last minute.

* * * * *

They buried him in the quiet little churchyard in Franconia. I didn't think when we last passed that spot together that he would be lying there so soon.

It seems to me to be hard for one to die so young; but when I look at the turbines and boilers, and all that stuff that I must design before I can graduate, I think that he has a regular snap compared with me.

It is very lonesome in the study now, and no one knows how I miss poor Dick.

Sometimes I sit there alone for hours together, and think of the good times we have had, and wish that they could come again.

I remember how one night I sat there thinking until I could endure it no longer, and taking up my hat, I went out of doors. The moon which was partly hidden behind the clouds threw a strange light upon the earth and seemed to make the Institute twice its real size. It seemed like some huge sphinx standing there, and I almost fancied I could whisper my feelings to it and be understood.

I wish it could have understood me, and also that it would have repeated my words to those within, for I remember standing there in the moonlight and calling out in an agonized voice, "O, ye rulers of the Institute! Why will you still persist in slinging at us that instrument of torture called the turbine!"

OUR "CREMATION."

Here at Stevens we do not "Bury the Ancient," simply because we have not the pleasant companionship with this much abused (?) volume, which always leads the

more fortunate (?) students, whose course embraces it, to have a general jollification and burial when they have "passed."

Nor did we bury anything; but we *burnt!* and what a feeling of relief we experienced as we watched the flames lick around the leaves and banged up corners of the well-soaked-in-oil literature, over which we had spent many weary and tiresome hours.

The whole thing had been kept a profound secret; in fact, so quiet had the founders of the project kept their pet scheme, that no one was aware of what was going on until all was over, and the whole affair voted a perfect success by the happy participants.

We assembled at the Institute at 9 p. m. on the —th of June, and when all was ready started for the Park, taking the precaution to split up into small parties, so that the Hobokenites who wear the uniform of the guardians of the peace should not take it into their precious heads to interfere. I forgot to mention that the torches were distributed, and the "book" presented by the "chief sinner" of '86, before starting.

When we arrived at our destination we found the band anxiously waiting our appearance, and, no doubt, more than willing that 9.30 p.m. should pass without our showing up; for the agreement with the band master had been, that in case we did not arrive at 9.30 he was at liberty to go; and as we would not tell him what it was all about, I suppose he felt rather shaky about what the consequences might be.

At the Park we formed in line and lit our torches, and as all were lighted at one and the same time, you can imagine the effect of the suddenly lighted up Park (we had taken care to turn down the gas in the immediate surroundings to heighten the effect), and then the band commenced No. I. on the programme, which was a brilliantly executed funeral dirge. To the slow movement of this tune we marched up Fourth to Hudson Streets, and from there to Wareing's, at which place the band, curiously enough, finished No. I. on the programme. All hands refreshed themselves, and started in line again toward the Campus, where a stand had been erected for the speakers, who were to tell us what joy it gave them to have the privilege of addressing so intelligent an assemblage, and how highly honored they felt at the distinction conferred on their unworthy selves. The procession filed slowly in, headed by our illustrious President and the officers of the class; next came the band,

playing No. II. on the programme, which was a brilliantly executed funeral dirge; following the musicians came our honorable class, to whose credit it may be said that they are the only class that has any of the *spirit* which is so often spoken of, but so seldom seen, in College history.

After we had assembled on the Campus, around the framework upon which the last scene was to be acted, the band played No. III. on the programme, which was a brilliantly executed funeral dirge. Then followed the speeches. Our President addressed his fellow students in tones of deepest sympathy and pathos, calling tears to every eye as he told us, in a voice broken with emotion, of the many heart breaking hours he had passed in endeavoring to understand the subject of English and American literature, as expounded and explained to a great degree of clearness and lucidity by those worthy writers, Shaw and Tuckerman; of the many times that he had righteously resolved to do a good night's work, and had been foolish enough to commence by taking up the book which he at this moment held in his hand, with the invariable result of going to sleep. The Chaplain next proceeded with the services agreed upon as fitting the subject in hand; after which the band played No. IV. on the programme, which was a brilliantly executed funeral dirge. Just as the last notes of No. IV. on the programme died away in faint echoes, the fatal match was applied to the victim, and as the flames were seen to have a good hold of his literatureship, the torches, which had all this time been burning brightly, and doing themselves proud in honor of the occasion by occasionally dropping oil on troubled waters as a slight amusement, were put out, and his literatureship allowed to burn in all his unprecedented and inimitably gorgeous glory. Only those who have had a long acquaintance with the now burnt book, can feel the feelings that we felt as we watched the fiery flames do their deadly duty dutifully. When the last few flickers were over, the students knew that the ceremony was over, as also did the band, which started to play No. V. on the programme, which was a brilliantly murdered version of "We wont go home until morning." Then, with three wild cheers, the students dispersed. Now, then, if this had happened, it would have been a fitting demonstration of our love for this particular book.

EM.

The worst season for bicycles—fall.

ATHLETIC MEETING.

We regret that our space will not allow a fuller account of our very successful field meeting. The promoters of the affair were agreeably surprised by the enthusiasm shown and the fair number of spectators. Now that the thing has been started with such favorable results, we hope that the future will witness an annual repetition of the same.

The following is the official report: 220 yards dash, Cotiart, '86, 27 1-8 sec.; 100 yards dash, Torrance, '84, 10 7-8 sec.; 100 yards, three legged race, W. Carroll, '84, Glasgow, '85, 14 sec.; one mile run, Maury, '84, 5 min. 4 sec.; hitch kick, Adriance, '85, 8 ft.; running high jump, Greenbaum, '85, 5 ft. 1 in.; running broad jump, Crisfield, '87, 18 ft. 6 1-2 in.; standing broad jump, Greenbaum, '85, 39 ft. 5 in.; half mile run, Maury '84, 2 min. 29 sec.; throwing base ball, Munkwitz, '85, 315 ft. 4 in.; throwing lacrosse ball, W. Carroll, '84, 255 ft. 11 in.; tug of war, won by '85.

INDICATOR CARD.

The motion which was made at the last Athletic Association meeting to the effect that the game of lacrosse be recognized by the association, was not gone about in the right way, and consequently was not carried through. The idea was to insure the use of the grounds for lacrosse and to allow players "to apply for the use of the grounds not as outside parties, but as members of the Athletic Association."

If the Athletic Association is to adopt the game and put a representative team from the college into the field, it must be done in the same manner that the foot ball and base ball teams are managed, by electing a captain of lacrosse each year, who shall have a seat in the Board of Directors, and whose duties shall be similar to other captains.

So long as there exists in the college a separate lacrosse association, the Athletic Association cannot be compelled to lend the grounds which are entrusted to its care, for a game which it does not control. If, however, a regular captain were elected by the Association, there would arise no complicity, and balls would be furnished, and the team would have the support of the college.

PERSONALS.

'76.

WM. KENT read a paper on "Rules for Boiler Tests" at the Pittsburg meeting of mechanical engineers.

'79.

JOHN S. COOKE was recently elected president and general manager of the Cooke Locomotive and Machine Co., Paterson, N. J.

'80.

JOHN W. LIEB, electrician to the Italian Edison Company, Milan, Italy, will visit the States for a brief period this summer.

'82.

CHAS. W. SCRIBNER is with the Logan Iron Works, Greenport, L. I.

F. W. COOKE is vice-president of the Cooke Locomotive and Machine Co., Paterson, N. J.

'82.

W. L. BREATH is with A. Cary Smith, yacht designer. Studio building, 54 West Tenth Street, New York.

WM. F. ZIMMERMAN, '76, E. B. Wall, '76, A. P. Trautwein, '76, E. P. Thompson, '78, Willard P. Parsons, '80, James B. Ladd, '81, W. T. Magruder, '81, and Albert Spies, '81, were recently elected members of the American Society of Mechanical Engineers.

PACKING.

Newly made Sophomore (just finishing exercise)—"Professor, what shall I go on next?" Professor L.—"Make a 'exagon."

N. M. S.—"How many sides shall I make it—eight?"

A rival of Pat has been found in an upper classman, who, while asserting his superior knowledge about certain peculiarities of land slides, remarked: "I speak from experience; I have never seen them."

STUFFING BOX.

The "Elysian Fields" will soon be a thing of the past.

Page, '87, was threatened some time ago with scarlet fever, but has entirely recovered.

"How does Rice get on with his bicycle?" "He get's on very well, but he doesn't stay on."

Nothing new from our Left Wing, only the temporary relief to know that the *Preps have gone* (for a while).

The Freshmen are receiving that all important instruction of how to earn their bread by the sweat of their brows.

The President of '86 favored the class with his first *real* speech on the occasion of his re-election as editor of the INDICATOR.

The Freshies' "term" expires July 15. They are being worked hard, but then Freshies are bad and require some correction.

Some would say the new helmets look well on the Hoboken police, but our opinion is rather that the "peeler" looks *well* in the helmet.

The INDICATOR, unfortunately, is not an exception to the rule, and must request subscribers to pay, so that the outgoing board can close their accounts.

Student.—"Well, professor, he was a sort of philosopher, I think the book says. O yes, I remember, he was a noted Meta Physics." "That will do, Mr.—."

The game between '85 and '86 was never played, and the record bears the testimony: "Class games, '85 vs. '86 not played. Remarks: The former afraid, the latter dasn't."

"The point of *infliction*," says a Sophomore in Calculus, "is taken—." But the suffering is over, and the point may now be anything and anywhere it should most desire. We ('86) are through with him.

Elections for editors of the "INDICATOR" of 1884-85 resulted in the return of the present editors from '85, '86 and '87, with the addition of Smith from '87. The editor from '88 is elected next term.

Our efforts in lacrosse are on the improve. One player has already been kept indoors with a very much disarranged face; but then it must still be borne in mind that the game is a more *gentle* one than foot ball.

The country must have been ransacked for the color of the catalogue cover. It must be a big thing, for out of many artists not one has

been able to come within miles of striking the same shade. But then we didn't inquire of any bill posters.

Something more from the Freshman class. A conversation, overheard, ran thusly : INDICATOR is better this month; there have been a good many articles contributed. I see several from "Em," but "Ex." seems to write the most; I wonder who *he* is?

The catalogue estimate of expenses for the course is right as far as it goes. But the two important items of text books and *get-rich-at-any-rate* shop material charges, when added, make one's financial condition as precarious as that of a Wall Street broker.

It is clearly evident that Prof. Wall's criticisms and discussions in literature have been more interesting and instructive than the tiresome repetitions which filled the text book used; and the question presents itself : Why cannot this branch of study be improved?

Commencement week—the first of the kind for Stevens—proved a grand success. '84 has set the example, and it remains to be seen whether the coming classes will exert themselves to leave as pleasant an impression behind as the graduating class this year have done.

Stevens has come out ahead on annuals this year. The last effort, the "Bolt," has made a successful departure from the ordinary style of college publication, and from the reports which come to us, the reception which it has received has amply repaid the editors for their trouble.

Base ball this season was, generally speaking, a failure. After buying new suits to make our team invincible and at the same time attractive, the pennant floats off toward Easton. We congratulate our friends at Lafayette, and shall look for them again next spring with higher hopes.

The same Freshman (that was) who is known familiarly to us in his dual effort to walk up a lamp post and organize a drum "corpse," has worked off fourteen pounds of unnecessary stoutness, and may be expected in the fall, full of new schemes and renewed "biceptial" power for daring adventures.

"Now, professor," thus recites a student, "it can't possibly make any difference. Why, if there is a body having a given force pulling it and an equal force pushing, why, of course,

it will stand still," and then he smiled at the professor for asking so simple a question of one whose knowledge of the subject was beyond dispute.

Complaints are still being made that a few of the *obliging* and curious continue to act as deputy mail carriers and to open all picture papers in the P. O., throwing them down anywhere after having amused themselves. There is a golden maxim, that "He who tends to his own business gets rich." Some of us would do well to consider this.

As a great many have already noticed the fact, it is hardly worth while to state for the few who haven't, that the entertainment so much talked off didn't "come off." A great many things interfered with its progress, and it was necessary to give the project up. Still we ought to devise some means of erecting a grand stand before the fall games.

Cricket *a la* St. George is something worth seeing. The great charm about this peculiar kind of cricket is that the players are real English. They can say "Bloody 'ot, 'Arry," "'As thee seen my bloomin' trap," etc., etc., but to play cricket is entirely incompatible with their dignity and waist measure. A game arranged for this last season would have been a walk over for the visiting team, but for the timely appearance of *four or five* Preps, who filled the vacancies on the St. George *eleven*.

Prof. Mayers' assistant, during his lectures before the class of '86, couldn't have been of the same order as the kind used in the French Academy. Prof. Mayers takes delight in telling how the assistant helps the professor lecturing and what a great relief it is to have one; but ours, the only specimen extant, feels his importance sufficiently to do everything he isn't wanted to, and then smiles and looks sublimely happy when he can tell a visitor, who happened to interfere with the lecture, that "*we* would be through shortly."

Couldn't the course of literature be shorn of some of its glory, and the subject of political economy be taken up to fill the vacancy? The latter study is an important one, and especially so to us. More benefit could be derived from this than the spending, as we now do, of hours in memorizing such facts as that a certain Sir Grandiloquent had lots of cash and court influence, a sort of ancient dude, but his writings were not "inimitable" enough

to merit praise. It takes five pages to explain this, after which in three lines the student is recommended to pass over Sir G.'s works as being below par.

Our worthy janitor having reached the climax of one of his *peculiar* humors, the other day was heard to inquire the shortest way to a crow bar which he wanted for some of his janitorial work. He found the proper corner after some judicious and thrilling efforts to circumnavigate the blast furnace and scale the dizzy heights of a soap box or two, and reappeared with a broomstick weighing down his right shoulder. Blandly smiling he disappeared in the dark, with an uncertain idea that the broomstick was the crow bar. But our janitor is always full of spirit, and thus it is his labors are made light.*

FROM REAL LIFE. — *Dramatis personæ* — A Student, a Janitor and a fence. *Scene* — Student going home, passes the fence, whose life is hanging on the ragged edge of despair in the effort to keep the Janitor "heads up."

Student, smiling pleasantly at Janitor — "How do you do, Mr. Porter?" (His real name wasn't Porter.)

Janitor — "Now (hic) I haven't expressed an opinion, I haven't uttered a single syllable which would criminate me. My argument remains intact, and to say that I had anything to do with (the fence shakes), and to say I did, is simply stating an untruth. My purpose in turning out the gas (fence cracks), Pres —"

Student continues the smiling as before, passes on, and next day notices carpenters at work on the fence. (True story).

A member of the Faculty who has been exercising our intellects on such subjects as the possibilities of what a body could be capable of doing at the centre of the earth, etc., is likely to have a rival from the ranks of '84. A true genius, in connection with his thesis on locomotives, after having proven theoretically and practically that the greatest efficiency could be reached by using a ten inch belt about the boiler (his experiments being made on an actual, real locomotive presented by the class), has drifted a little from his subject, and nightly wrestles with a huge combination of dividers and parallel rulers, to see if it isn't possible to draw a series of straight lines parallel and mutually perpendicular. The outcome of this will probably be a new text book, a sort of companion to descriptive, with which to while away our *extra* time.

EXCHANGES.

We have been favored during the past month with many exchanges, among them a number of new ones, to all of which we would gladly give notice were it possible, but we can of course notice briefly only a few.

Our engineering exchanges particularly are worthy of notice. We wish that we could present to our readers even a small part of the great amount of information contained in them, but this being, of course, impossible, we remind them that these journals may be purchased at almost any news store, and the student will be amply repaid for their perusal.

In the *American Engineer* we notice among the great number of excellent articles in every number a series which has appeared for a number of weeks on "The Most Economical Steam Engine," and also one in which the theory of the causing of floods by destruction of forests is discussed. The person who is interested in iron construction will also find in the May numbers many interesting articles and illustrations on work in the various branches of this department, as on bridges and roofs.

In the monthly edition of *Mechanics* we notice a very interesting article on the construction of heavy shafts for steamships, and an excellently illustrated description of a swing crane, of sixty tons capacity, built and in successful operation at Rotterdam, Holland. The number of May 10 contains an account of experiment on the value of chilled iron as a substance for armor plating. On being tested it gave encouraging results. Although breaking more readily than a malleable material, it was perfectly impenetrable, experiencing only a slight indentation on being struck by a steel shell, which pierced without difficulty a 15 inch wrought iron plate.

The paper contains nothing but what will sustain its reputation as one of the foremost journals in its department.

The May number of *Van Nostrand's Engineering Magazine*, in addition to a number of articles on mathematical and mechanical subjects, gives three articles of interest and value to the electrician. The first is on "Electric Launches," and is, as its title indicates, devoted to a consideration of the most economical and efficient method of applying electric motors to the propulsion of small crafts. The advantages of this motor—economy of space, absence of heat and lightness—are very great.

In point of economy, however, steam is as yet decidedly ahead, the comparative costs of steam, storage batteries and primary zinc batteries being roughly given by the writer as 1, 2.5, and 12.

The remaining two articles are by the best authorities—one on "Electrical Units of Measurement," by Sir Wm. Thompson; the other on "Recent Progress in Dynamo Electric Machines," by Professor Silvanus P. Thompson.

The last month's number of the *Electrical Review* contains many interesting contributions, and much descriptive matter relative to recent inventions and improvements. Among the latter is a minute description, well illustrated, of a new system of lighting—the Van Depoele. It is a Chicago invention, and seems to have sprung rapidly into favor, having been already adopted by many cities and towns.

The *Electrician and Electrical Engineer* presents in its May number a comprehensive article on "Electro Magnets."

A very interesting part of the contents is the correspondence from various great cities giving the electrical news from the respective places.

It is with pleasure that we make the acquaintance of *Amateur Mechanics*, an English publication devoted to mechanical theory and manipulation. The contents are excellent, being devoid of all technicalities, written in a plain, easy manner, and are of a practical nature that will recommend them to the general reader. All the operations described are well illustrated in a supplement. We wish for this young magazine a most successful future, and feel safe in predicting the same for it. It is published* by Iliffe & Sons, 98 Fleet Street, E. C., London.

We are glad to acknowledge the receipt of the *Journal of the Franklin Institute*, for June. The contents are varied, voluminous, and, in regard to quality, in keeping with the high reputation which the productions of the society enjoys. The article of most interest to the student is a revision of Rankine's General Theory of the Turbine, by Professor Wood. In it he demonstrates that the so-called "general" case is really a case of very limited application, and the object of Professor Wood's treatment is to show the limitations and extend the demonstration. If we mistake not, an opportunity will be given the students to

obtain copies of the *Journal*, when they can compare the two demonstrations.

We would notice for the first time the *Yale Record*, this being our first opportunity, although we have previously received the paper. It presents an excellent appearance, and is in point of contents and finish what one would expect of a Yale periodical. We commend the tone of the editorial condemning the action of the students who burned the shutters from the hall. For such conduct there is no excuse; other fuel would have burned just as well, and such an act shows a spirit of wanton destructiveness which, even though often met, is entirely out of place. The articles, poems, etc., are very interesting.

We have received a copy of the present year's edition of the *Bolt*, which appeared shortly after our last issue. The magazine is decidedly well arranged, contains a considerable amount of good reading matter, and is unusually well provided with cuts. The finish of the book is excellent, paper, type and binding displaying no careless work, and the neat appearance of the whole being a credit to the management. We can only hope that the next year's number may be equal in all respects to the present one.

THE COLLEGE WORLD.

COLUMBIA.—The Board of Editors of the *Columbiad* have adopted the plan of accepting contributions from students in all the classes. —The "Class Day" exercises were unusually interesting, and were enjoyed by a large number of young ladies—all friends, of course, of the Seniors. —The *Spectator* gives notice that it will support the Republican party in the coming campaign, and that students are invited to meet at the office of the paper, on October 2, for the purpose of forming a campaign club. —One of the class of '88 is said to have come in a baby carriage. —The Freshman class will number about one hundred. —The total number of graduates from the departments of the college since its foundation now amounts to 8,500. —President Barnard sailed for Europe some time since, and will be gone until September 15. —Since the institution of the intercollegiate games Columbia has won 69 prizes out of 260 given. Harvard is a close second, with 57. —The Third Year mining engineers

started on their summer trip to the Lake Superior mining regions, June 9.—A meeting of the graduates of the School of Mines was held at Denver, Col., on July 1.

HARVARD.—Great surprise is expressed at the result of the Yale-Harvard race, as considerable confidence was placed in the Harvard crew.—The Senior class held their dinner on Monday, June 23.—Of the Sophomore class, it is said that 99 per cent. part their hair in the middle.—The name of the *Herald Crimson* has been lately changed to *The Daily Crimson*.—A Canoe Club has been formed.—Grounds have been secured for a polo club.—The three strongest men in the college are in the Senior class.—Harvard has the college and national championship in tennis.—A swimming tank will soon be placed in the gymnasium.—A bronze statue of the Rev. John Harvard will be unveiled at Harvard in the coming September. It is the gift of Gen. Samuel T. Bridge.

YALE.—It is proposed to form a Knickerbocker club, if thirty names can be obtained of those who will agree to wear Knickerbockers all the time.—Out of the first thirty-two Governors of Connecticut, fifteen were Yale men.—Eighteen, says President Porter, is the proper age to enter college.—'84 graduated 113 men.—The class of '87 had about \$100 in a bank that failed recently.—The Seniors are complaining at the exorbitant charges for class suppers.

IN GENERAL.—Of 260 men in Brown, 107 are members of secret fraternities.—There are 330 colleges and universities in the United States, of which only twenty-four have more than 200 students, and only seventeen have more than twenty teachers. A large number of these colleges furnish no better education than can be obtained in a high school of the first class. One "university" in this country has three professors and twelve students, and another has two professors and eighteen students. These professors can take the college home with them at night, and thus prevent it from getting into mischief.—*The Tribune.*—There is a debt of \$600 on the *Lafayette College Journal*.—The New York *Evening Post* now has regular correspondents at Yale, Princeton, Williams, Lafayette, Amherst, Cornell and Harvard.—The young ladies of the Ontario Ladies' College have organized two base ball clubs.—The students at Amherst are endeavoring to organize a polo team.—A lecture has been delivered at Cornell on

"New Jersey; or, the Mysteries of an Unknown Land."—Vassar girls are said to be so modest that they will not work on improper fractions.—*Ex.*—A new college for the higher education of women has been chartered in New York.—A new college for women will be opened in October at West-bridgeport, Mass.—At Little Rock University a Sophomore has been fined two dollars for kissing a co-ed. Judging from the co-eds it has been our misfortune to see, the fine should have been changed to a premium.—*Ex.*

CHIPPINGS.

We stood at the bars as the sun went down,
Behind the hills on a summer's day;
Her eyes were tender and big and brown,
Her breath as sweet as the new mown hay.
Far from the west the faint sunshine
Shown sparkling o'er the radiant air;
Those deep brown eyes were turned toward mine,
A look of contentment rested there.
I see her bathed in the sunlight flood,
I see her standing peacefully now;
Peacefully standing and chewing her cud,
As I stroked her ears—that Jersey cow.
Harvard Advocate.

How does Pat get over single blessedness? He proposes to Bridg-it.—*Ex.*

"Dying in poverty," mused a needy student, "is nothing; it is living in poverty that is hard on a fellow."—*Ex.*

WIT AND WISDOM.—Student (translating): "And—er—then—er—he—er—went—er—and—er." Professor: "Don't laugh, gentlemen; to err is human."—*Ex.*

Conductor: "Smith Street! Smith Street!"—Smith (who is about half seas over, aroused from his nap by the accusation): "Hic, old man; guess's my treat last."—*Ex.*

Prof. (near the close of a recitation): "Are there any questions any one would like to ask?" Pupil (not prepared and anxious): "What time is it, please?"—*Ex.*

Some one has ascertained the reason that borrowed books are so seldom returned. It is because it is easier to retain the books than the thoughts expressed in them.—*Ex.*

There is not much satisfaction in editors. A correspondent came to the chief last night and exhaustedly inquired: "What in the world shall I write about?" "Write about two columns and a half," was the pathetic reply.—*Ex.*

* THE *

Stevens Indicator

Vol. 1.

* October, 1884. *

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HOBOKEN, N. J.:

* Stevens Institute of Technology. *

— PUBLISHED MONTHLY. —

THE STEVENS INDICATOR.

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T H E

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HOBOKEN, N. J., OCTOBER, 1884.

No. 7.

The Stevens Indicator.

PUBLISHED ON THE
1ST OF EACH MONTH, DURING THE COLLEGE YEAR,
BY THE STUDENTS OF

Stevens Institute of Technology.

Editors.

EDITOR-IN-CHIEF, C. R. COLLINS, '86.
BUSINESS EDITOR, E. P. MOWTON, '86.
EXCHANGE EDITOR, NORTH MCLEAN, '85.

Local Editors.

HENRY ABBEY, '85.
LADD PLUMLEY, '87. ROBT. G. SMITH, '87.
HUBERT S. WYNKOOP, '88.

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Subscribers will please immediately notify us of any change in their addresses or failure to receive the paper regularly.

The writer's full name, as well as his NOM DE PLUME, must accompany the article, as assurance of good faith and reliability; but it will not be published, unless desired.

Exchanges, contributions, subscriptions, advertisements, and all other communications by mail, should be addressed to THE STEVENS INDICATOR, Stevens Institute, Hoboken, N. J.

THE INDICATOR for October greets its friends (it has no enemies), and at the same time congratulates itself that it is but two weeks behind time.

Some of its contents may be new; some, of course, will have grown old with long standing on the editorial shelf.

The facts, ladies and gentlemen, boys and Preps., are these: The Institute has about one hundred and seventy students, each one proclaiming his intention to support THE INDICATOR or burst. But when the first of October came around, but six of the one hundred and seventy volunteered to support THE INDICATOR in preference to bursting.

A knowledge of the amount of work the College requires of each student will show that the six, with a new recruit, had to use most of their spare time in order to publish an October INDICATOR even this late.

We are not complaining, but all we hope is, if the one hundred and sixty-three don't do something for THE INDICATOR next month, that they will every one explode, burst or otherwise be reduced to nothingness.

IN the June number of THE INDICATOR the suggestion was made that the course in English Literature be shortened in order to make room for the science of Political Economy. This is to us, and, we believe, to all the students, an important suggestion, and one that may reasonably occupy the attention of the Faculty. In canvassing among the different classes for statistics for the coming presidential election, we have found a deplorable want of knowledge in regard to candidates, party platforms and political terms. We do not think that an intimate acquaintance with the details of the campaigns is at all desirable in a student, but when he cannot express his opinions intelligently in regard to a question at issue his education is surely deficient. On the other hand, it is not to be desired that the class be obliged to listen to bigoted professors ranting on "Free Trade" or "Protection," as is the case in some of our colleges. Far better that the study be omitted entirely.

Now we are ready with a plan—as all those who advocate a desired change should be—and it is this: In the curriculum, as at present laid down in the catalogue, the study of the English language is pursued in the Sophomore year as follows: First term, Shaw's

English Literature; second term, English Literature of the 17th and 18th Centuries; third term, English and American Literature of the 19th Century. Now, why may not the course in English be condensed so that the catalogue shall read: First term, Political Economy; second and third terms English Literature? The course in Political Economy might be made to embrace recitations from some modern text book and lectures by the professor; and after the first few weeks, when an insight into the subject has been obtained by the student, he should be required frequently to take part in debates upon prominent topics, the professor deciding according to the points advanced by the different sides.

By this means the student learns to grapple with these matters as they are brought up in politics, and will not be readily lead astray by a demagogue orator or a cultured politician. There is no object more open to ridicule than a man who is forward in expressing his opinion, but when questioned, cannot state his grounds for such belief other than that such and such an editor or prominent party leader has said so. Unfortunately there are many such in this country. May it never be said that a Stevens Alumnus is such a man!

It is our earnest desire that the Faculty may see the advisability of making provision for this long felt want, and we think that such a change in the curriculum would never be regretted. The interest manifested and knowledge gained by the students in such an important and popular branch of science would more than compensate for the loss of time in literature.

CIRCUMSTANCES prevented last year's Glee Club from practising much. Their organization was not completed until the winter term; and then the arduous task of compiling a thesis occupied so large a portion of the time of some members during the spring term, that they were unable to attend the Glee Club's meetings.

As will be seen on another page, some of

the old members are trying to fill up the ranks. They want to increase their number, to engage a competent leader, and to organize and get to work immediately.

Stevens proves no exception to the rule that tenors are scarce, and all students who can sing, particularly those singing tenor, should not be too modest or backward in applying for admission, for we have no hesitation in saying that all belonging to the club will be both pleased and profited. The public rehearsal given last winter seemed to have been appreciated, and if all who have it in their power will assist, we may have the pleasure of attending not only their rehearsals, but concerts which will be a credit to the Club and the College.

AT the Athletic Association meeting on Oct. 1st the subject of a new track at the grounds was again brought up and discussed. As the matter of training and a gymnasium is now being agitated by the students, a few remarks here might throw some light on the subject. In the first place, we will give a brief history of the old track: It was ordered built by the association in 1877, and George Giles was employed to see that the work was done. It was composed of a lower layer of cinders and clay, and an upper layer of fine cinders well rolled, the whole being about one foot thick. The first year only a few students took advantage of the new track, and their enthusiasm soon slackened to such an extent, that by the following fall the track was almost deserted and weeds were fast gaining a footing in it. It was evident that we could not use a track enough to pay to keep it in order.

In 1882 more space for tennis courts was needed, and the field was also extended, so the track was ordered dug up at as great expense as the first building of it cost. The question has arisen, do we want to repeat the experiment? Various arguments have been brought up *pro* and *con*. The expense of a track would have to be defrayed by an assessment upon the members. Now, if an assessment is to be

made at all, would it not be better to devote the funds to the erection of a stand at the grounds for the seating of spectators? This was proposed last year and met with great favor, but the only obstruction to carrying it out was the liability of the grounds being soon appropriated for some other purposes. The objection has now been removed, and we are assured of at least one year's notice before such is done, and it was also expressed that it was highly improbable that any other use would be made of the ground for some years to come.

Were a stand erected, the seating portion might be so elevated as to make ample room beneath for dressing rooms, and a room fitted with various appliances for exercising in which training might go on during inclement weather, when a track would be useless. The expense of building a stand would be more than a track, but would it not be more advisable to have a thing of usefulness to all and an ornament to the grounds than a track to be monopolized, perhaps, by a few bicyclists?

It must be conceded by all that some sort of new dressing rooms are an absolute necessity. It is a wonder that a team will visit us at all when they have to be ushered into such an edifice of comfort and beauty as we possess, in order to disrobe.

WE publish in another column a communication signed "ZID," in regard to the proposed "committee on college pins." The objections that he urges against the choosing of such a pin are (1), that the taste of '87 and '88 is not of a quality to suit all; (2) that such a pin is comparatively valueless; (3) that it will be either too expensive or too cheap. We think that these objections may be met, and, perhaps, to "Zid's" own satisfaction.

Since we received this communication the matter has taken on a new aspect. The committees from '87 and '88 met last week, and it was decided to request the presidents of the classes of '85 and '86 to appoint committees of three from their respective classes. Thus,

instead of a co-operative plan effecting the two lower classes, there is a convention of delegates from each of the four classes, and the object of this convention is to select designs, which are to be submitted to the students and voted upon.

Now, as to the objections. In the first place, the pin will be an expression of the taste of the students of the Institute, not of one class merely. Who have a better right to decide upon such a matter than those most directly concerned? The decision once made, the announcement goes forth over the country that the students of the Stevens Institute of Technology have, by ballot, declared that the "Stevens pin" shall now and hereafter be of such or such a design. What class would ever think of changing it? Sooner think of changing college colors for no better reason than that some student found the present shade objectionable!

We believe that "Zid" is in the wrong in stating that college pins are never worn after graduation. The reason they are not worn continuously is that there is no need for them; but let there be a reunion or a foot ball match or a boat race, and the badges are taken from their cotton lined boxes and pinned on in their accustomed places. No need of introduction then! The middle aged man and the youth just graduated meet for the first time like old friends. Then, again, the pin is valuable in this respect: it places the wearer where he belongs, in the front rank; for a man recognized to be a Stevens graduate can possess no higher recommendation as to his ability.

In regard to expense, we think that a reform is needed. It almost always happens that in a large class there are some to whom money is not a common article, particularly in a college like ours, where the expenses are very great. Now, as a rule, the more fortunate are continually devising schemes requiring the financial aid of the entire class. Conspicuously among these schemes is that for a class pin. Some favor a ten dollar pin;

others, one costing but four dollars. A vote is taken, and the majority are of the first mentioned. What are the poorer students to do? If they buy the pin, they must suffer inconvenience in some other direction; if they refuse, they are accused of "want of class feeling," "stinginess," etc. Thus it often happens that the pin is bought only to stay the torrent of indignation poured out by unthinking members of the class. With a standard pin this difficulty would to a great degree be avoided, as each student will vote according to his taste or means, as he prefers. In all probability the pin selected will be a medium between the expensive and the cheap design.

Now that the plan for the adoption of a college pin has become general, dealing with the college rather than with classes, we are heartily in favor of it, and eagerly look forward to the realization of such a project.

COMMUNICATIONS.

To the Editors of the Indicator:

I notice that the idea of a college pin is being discussed by '87, with the hope of getting the co-operation of '88 and subsequent classes as they enter in introducing it, so that after '86 the class pins may be alike for all classes, with the exception of the dates, of course. It seems to me that this course would not be advisable, even if it is now suited to '87 and '88, for the question arises, would designs adopted by these two classes be acceptable to subsequent classes? True, it may seem at first one Stevens man would be able to know another of a different class, and would be recognized as a Stevens man by other collegians if they happened to know the pin; yet, would not the small advantages thus derived be more than compensated by the fact that each class, by its own separate pin, exercises its taste and humor, according to its pleasure and without the regrets arising from the fact that they were not the ones who had designed it, and thinking that if they had, it would have been much more artistic and more expressive of their taste as a class? Moreover, when two young men are thrown together, each soon discovers whether the other one is a college man or not; and, also, in the case of each being from Stevens, they

know each other already, or, at least, have had opportunity, except when they are of classes four or more years apart, in which case one or both are graduates, and a graduate of any college never wears his pin after graduation, merely keeping it as a memento of happy days gone by. Again, one class might be disposed to have a more or less expensive pin than another, while with a prescribed college pin, of invariable design, and that, possibly, of questionable beauty, each class would have to adopt the same one. Hence, from these considerations, do you not agree with the proposition stated at first: it is inadvisable? "ZID."

INDICATOR CARDS.

We notice that the bulletin board, supposed to be a source of information on college matters for the students, is turned into an advertising medium for boarding houses. Some time ago our hearts were rejoiced at seeing a compact list of all boarding houses placed in one corner of the board, but since then private advertisements have been encroaching more and more on the already limited space, we do not know with whose permission. One begins to wonder whether, judging from the reading matter on the board, the students of Stevens are most interested in the matter of spare room in Hoboken houses, or in their own affairs of studies and athletics.

A noteworthy change has taken place in the shop. The tool room has been moved down to the first floor of the shop, at the north end. It connects by a small elevator with the supply room upstairs, so that students may obtain tools and material at the same time. The dressing room, formerly taking up the whole width of the wing, has been cut in half, the part connecting with the shop, used as a dressing room, has the lockers ranged on two sides of the room. The other part connects with the tool room, where overalls are to be handed in and are taken charge of by the person in the tool room. Thus tool lockers and tool and stock supplies are accessible without the numerous journeys upstairs which we were obliged to make under the old plan. It will also be seen that every one will have his own overalls without fear of their being "borrowed" at different times. Very good; one of those improvements for which, it is said, there is always room.

WHAT MIGHT HAVE HAPPENED AT THE LAST SOPHOMORE CLASS MEETING.

While I was dozing in the Literature class the other day, the lesson came to an end. When about to leave the room I seemed to hear notice given that a class meeting would be held at that time and place. Knowing that this was the regular annual meeting, and that the principal purpose of the gathering was to elect officers for the year '84-'85, I waited in my seat. The president rose with great dignity and took the place just vacated by Professor Wall. In a few apt and eloquent words he informed the class of the purpose of the meeting and called for nominations for the chief executive office. Like the last Chicago convention, everybody seemed to wish that everybody else would keep silent while everybody spoke. This plan gave results for the first few moments like those in a meeting of the New York Park Commissioners, when only three are present, but soon augmenting as the number of speakers increased, the flood of learned and majestic eloquence carried everything before it. Motions, anti-motions, points of order and amendments filled the air so full of words that at one and the same time the writer counted 753 words in mid air, and 483½ about leaving the mouths of the orators. Such is the power of mind over matter, that even the chalk, urged by the mental electricity which prevailed all space, was seen to leave the blackboard and table and jump in a lively manner about the room. The writer knows this to be true, as he was hit in various tender parts of the body by small particles of chalk, which seemed to come from no one knew whence. With many, this exhibition would have been entertaining. Not so, however, with the president, who knew that his reputation through all time would depend upon his keeping order at this meeting—the last that he was to preside over; at least during the Sophomore term—and so, knowing what responsibility rested upon him, the honorable gentleman made all the noise he could on his platform, thus hoping to drown the sounds of discord and prevent undue oratorical prominence in the back of the room. At last, with fearful and astonishing confusion, a president, vice president and secretary were elected, but, oh! what dire distress followed the motion to abolish the office of chaplain. A division on the question was called, and the contesting

parties took or attempted to take opposite sides of the room, no one knowing how to vote or on which side of the room to go if they did. This was the culminating and last act, and as the humble narrator of these facts thought it best to leave at that time, he can inform the reading public of nothing further.

LECTURE

DELIVERED BEFORE THE SENIOR CLASS OF
STEVENS INSTITUTE OF TECHNOLOGY,
HOBOKEN, N. J., NOV. 18, 1881.

Mr. DENTON—Mr. Allen has very kindly consented to allow us to ask him any questions we choose to-day, so that if there is anything in the questions asked by me which suggests other questions to any one here, let us have them, so that we can cover the ground. We probably shall not get another such opportunity as this for obtaining information about the very important matter of boiler insurance, so that we ought to make the most of it.

Mr. ALLEN—I will make this reservation, gentlemen: While I agree to answer to the best of my ability any questions that may be put to me, I am not sure that I shall be able to do so satisfactorily.

Mr. DENTON—Will you please explain in general outline what it is that the Hartford Steam Boiler Inspection and Insurance Company aims to do for the public, and what is about the charge to the public for their services?

Mr. ALLEN—Professor Denton and gentlemen: The object of the Hartford Steam Boiler Inspection and Insurance Company is to prevent the explosion of boilers by making periodical examinations. I am most familiar with the business as conducted at our New York branch office. We make quarterly visits of inspection to the premises, and at those inspection visits the inspector looks at the boiler just as it is being used in its regular operations. He looks along the furnace sheets and at the connections, safety valves, steam gauges, water gauges, and all the safety appliances, and reports their condition. A verbal report is given to the superintendent, or manager, or chief engineer—the responsible person, whoever he may be, on the premises—and the inspector on his return to the company's office writes out a report, which is sent by mail. Once or twice a year besides that, each boiler is thor-

oughly examined internally and externally by sound—by the hammer. The charges vary according to the condition of the boiler, its situation, the steam pressure carried, and a great many other considerations, generally from one to three per cent.

Mr. DENTON—Of the cost of the boiler?

Mr. ALLEN—Not of necessity. We insure against all damage by explosion. It is on the boilers, building, stock and machinery.

Mr. DENTON—What corps of employes is necessary to perform the above service?

Mr. ALLEN—Well, I have not had occasion recently to look up the number of boilers we are insuring. But two years ago we had ten thousand boilers under the company's charge. The number has since increased. We have, as far as I know, some thirty-five inspectors, with probably an equal number of special agents, who have some supervision over the works.

Mr. DENTON—Are those boilers distributed over the entire country, or are they confined to a particular locality?

Mr. ALLEN—Not over the entire country, but in those localities that are pretty thickly settled, where business may be conducted with profit; in the well settled States and in the larger cities. The company does no business in the Territories, nor where steam power is scattered, as in most of the Western States. I think that in the West we do not extend operations farther than Illinois, and in the Southwest farther than Missouri. And in the South, beyond some portion of the District of Columbia, perhaps, operated from the Baltimore office, I think we have no business.

Mr. DENTON—These thirty-five inspectors constitute, then, all—outside of the commercial equipment—the officials who—

Mr. ALLEN—Yes, sir.

Mr. DENTON—And besides these inspectors and the special agents and chief inspector, they are the only ones that are necessary to take care of the ten thousand boilers?

Mr. ALLEN—Those are the gentlemen depended on to make the examinations. I omitted the general agents, who have more or less to do with those things, and the president of the company, who acts as the chief engineer, to whom all disputed matters are referred for decision.

Mr. DENTON—How are these inspectors trained for their work, and from what class of men are recruits drawn?

Mr. ALLEN—The company's experience, so far as I know, and certainly our experience here at the New York office, has been most

successful with mechanical engineers—that is, steam engineers who are practical mechanics—and there are some boiler makers on the force, but the bulk of them I believe are mechanical engineers. They are trained in this way: When a new inspector is added to the force he accompanies one of the older inspectors on his round of visits for a month or more, before the company allows him to make any inspections on his own responsibility.

Mr. DENTON—Are there any of technical education among the inspectors?

Mr. ALLEN—I think not, sir.

Mr. DENTON—How would the course of such an institution as this qualify its graduates for such duty? Would it be of any assistance?

Mr. ALLEN—It would be of very valuable assistance, sir.

NEW YORK, Nov. 19, 1884.

In correction to a reply to question concerning the selection of employes by this company, Mr. Allen says:

"I said mechanical engineers—meaning engineer mechanics. That refers to inspectors only. Those to whom more important duties are intrusted are selected from better material.

"As a matter of fact, I applied to your Institute, through Prof. Thurston, to recommend one of his graduates for employment as special agent, assigned to duty upon the locomotive at home office, Hartford, only a few months ago. He informed me, so far as he then knew, they were all profitably engaged, and for that reason we looked elsewhere. Mr. H. F. Smith was appointed, a graduate of some Eastern technical school. I have no doubt the company will be only too glad to avail themselves of the benefits conferred by institutions similar to the 'Stevens Institute' in making selections for future appointments. The company have a system of boiler setting which they recommend when their advice is sought."

Mr. DENTON—But besides that, it is essential that a good deal of practical mechanical knowledge should supplement it?

Mr. ALLEN—Yes, sir.

Mr. DENTON—What other boiler insurance companies are there in this country and in Europe?

Mr. ALLEN—Well, there are some six companies in England and some others on the continent; how many, I do not know. They are being established from year to year. In this country we have a Mutual Insurance Company in Boston, and I believe there is a Mutual Insurance Company in Rhode Island, and in New York a company that takes a number of different kinds of business, among others that of steam boilers in New York State. I believe those are the only companies in this country. The mutual insurance companies are not represented hereabout. The Rhode Island Mutual—I believe that is the

name of it—or the Providence Mutual (I don't know which) does not, I think, operate outside of a small locality around in Rhode Island; and the Boston Mutual does business with the mills through Massachusetts and New York—a very limited business. The New York company is now pushing for business in the larger cities of the country.

Mr. DENTON—And in England what are the prominent companies?

Mr. ALLEN—The prominent companies are the Manchester Steam Users' Association, which, however, is not an insurance company. It is an association of manufacturers who subscribe according to the expenses pro rata, and employ inspectors who go about and examine the boilers of the members of the association. In fact, that was the starting point in this business. It was organized by Professor Fairbairn about forty years ago—

Mr. DENTON—Sir William Fairbairn?

Mr. ALLEN—Sir William Fairbairn. And the services of the inspectors proved so valuable to the manufacturers in the district they visited that companies were organized on the insurance principle to indemnify in case of loss; not only to make inspections, but to indemnify if loss occurred. The Manchester Steam Users' Association has been a highly successful organization, and is doing excellent service to-day, and is making experiments from time to time on a number of disputed points concerning boilers.

Mr. DENTON—The chief technical authority in that is Mr. Lavington Fletcher?

Mr. ALLEN—Yes, sir, he is the chief engineer. Then there is the National Boiler Insurance Company. I am not able to give you the names of all; there are some five or six.

Mr. DENTON—Are there any in France or Germany?

Mr. ALLEN—Yes, sir; societies much after the plan, I think, of the Manchester Steam Users' Association. In Germany there are insurance companies. In France, so far as I know, there are no insurance companies, but the organization is after the plan of the Manchester Steam Users' Association.

Mr. DENTON—The Manchester Steam Users' was, then, the first?

Mr. ALLEN—Yes, sir.

Mr. DENTON—And all others that followed based their business and organization on the plan of that?

Mr. ALLEN—Yes, sir; as far as the examinations were concerned. I think the next company to succeed them was the Insurance

and Steam Power Company, limited. I think that was in Manchester. I think that it was organized by some of the officers who went out of the Manchester Steam Users' Association, and for commercial considerations organized the insurance part of the business.

Mr. DENTON—Who was the originator of boiler insurance in this country?

Mr. ALLEN—J. M. Allen, of Hartford.

Mr. DENTON—Was the Hartford company the first to undertake risks for boilers?

Mr. ALLEN—Yes, sir; the Hartford is the pioneer company in the United States in that line of business.

Mr. DENTON—Do the fields of labor which these companies endeavor to serve differ essentially from that of the Hartford company?

Mr. ALLEN—In this country, you refer to?

Mr. DENTON—Yes.

Mr. ALLEN—Well, the other companies that I have spoken of are in limited districts. The Hartford company is represented, as I have said, through the Middle States, through New England, in the West, and to some extent in the Southwest. The other companies are only in the larger cities, New York, Boston, Philadelphia and Baltimore. There is one other company I did not mention, the New York company—the Fidelity and Casualty Company it is called.

Mr. DENTON—And the commercial form in which the duty is undertaken by those companies is best stated as that of preventing boiler explosions?

Mr. ALLEN—Yes, sir; by periodical examinations.

Mr. DENTON—Is there any direction in which the field of labor or effectiveness of boiler insurance companies could be increased by proper legislative assistance?

Mr. ALLEN—Well, we ask to be left alone by State legislation. They make us a great deal of difficulty and study to impose arbitrary restrictions for their own purposes. It is best for us not to characterize it, perhaps. The courts have held very strongly that the steam user is responsible for any negligence on the part of his engineer, or any want of proper equipment on the boiler—anything that is essential to the safety of the boiler. You have recently had a case in Jersey City—the dry dock explosion—in which the engineer and the owners are now under trial, and have been presented to the grand jury, and, I am not sure, but I think, indicted, and the case will probably be tried. The courts have

held that in the event of an explosion the owner of the establishment, if suits are instituted, is bound to prove that every thing necessary was done to prevent an explosion, that a competent engineer was employed, and that a boiler of the requisite strength and properly kept was used.

Mr. DENTON—How does that interfere with the Boiler Insurance Company's intentions?

Mr. ALLEN—That rather contributes, I think, to the business of such companies. It does not coerce the steam user into employing an insurance company; but if he desires to obtain the best advice and the best assistance in preventing such explosions, he will of necessity employ a company that has a competent corps of inspectors and is equipped for doing the work; and in one or two cases in which losses have occurred by explosion, and it was shown that the boiler had not lacked necessary repairs, and was provided with the safety equipments, that constituted a successful defence, and verdicts were not found against the owners.

Mr. DENTON—In case one desired to secure the best assistance of the Hartford company in purchasing and using a steam boiler, what advice could he get from them regarding the best form of boiler to buy, where to buy it and what material to put into it?

Mr. ALLEN—The company would, on receiving from the person proposing to purchase a boiler, a promise—which of course is readily given—to insure it with the company on its completion, advise him as to the design of the boiler, and as to the type of boiler according to his needs and according to the locality where it is to be used. Concerning the manufacture of the boiler, the company respectfully decline to make any recommendations. They will furnish the steam user who desires a specification of details of the boiler, and he can invite proposals from the boiler makers. On accepting the proposal he thinks best, he notifies the company, and they send an inspector from time to time to the boiler shop where the boiler is being constructed, and it is the business of the inspector to see that the conditions of the contract are fully complied with, and in that way the steam user and ourselves are fully protected. No matter what boiler maker may be selected, they ask that the boiler maker comply with the conditions of the specification, and if he does not, the boiler will be condemned and the work upon it stopped.

Mr. DENTON—Some years ago Mr. Lavington Fletcher, of the Manchester Steam Users' Association, put forward a design of a Lancashire boiler as being the opinion of the society that that was as good a boiler as one could use. Am I right in that?

Mr. ALLEN—Yes, sir.

Mr. DENTON—Do the companies in this country give their sanction to any particular form of boiler to that extent?

Mr. ALLEN—No, sir.

Mr. DENTON—Is it that the circumstances of the Manchester company enable them to do that? That is, does their work lie in such a direction that they can do it?

Mr. ALLEN—We have assumed, sir, that that is the case. The Manchester company make a series of experiments, and through their chief engineer determine that a certain boiler is the best to use, and recommend the adoption of such boiler. One of the other companies have a fusible plug that they put in the crown sheet, or in the fire furnace of the boiler, usually in the crown sheet or back connection at its lowest point, and they make a rebate on the insurance where this patent of theirs is employed; but in this country such things as that are familiarly known as jobs, and a company would incur the opposition of all our manufacturing boiler makers and people who are in the supply line if they recommended any particular contrivance. We have had to be extraordinarily careful in the conduct of our business to keep clear of all those things. The company's influence is sought almost every hour to put something on the market, so that it may be said that the Hartford Steam Boiler Inspection and Insurance Company favor this contrivance or the other contrivance; but they and all their subordinates have to be very careful that they do not approve anything officially. All those things conducive to the safety of boilers are approved generally, and we leave it to the steam user and owner of the boiler as to putting on safety appliances outside the ordinary equipments.

Mr. DENTON—If the form of boiler and place of purchase were settled, how next could the company assist the buyer?

Mr. ALLEN—Ordinarily we could not assist. The transportation of the boiler would be the next thing in order, and the place in which it is to be set. Boilers are oftentimes injured in transportation by the chafing of the chains or the manner in which they are blocked up, and sometimes by wedging up the tubes and pry-

ing up the tubes while moving the boiler around, but ordinarily the maker attends to that. We have found cases, however, in which there was such injury. The company could not render much service under such circumstances unless the boiler had been used somewhere.

Mr. DENTON—If the boiler were ready for setting, what advice and assistance would the company give the owner regarding the setting and the connections?

Mr. ALLEN—The company would advise concerning the setting and connections of the boiler in accordance with their experience, so as to make the boiler accessible in every part for inspection and to make the setting a durable one, and to run the pipes and connections in a substantial and safe way.

Mr. DENTON—Would they criticise a drawing of a boiler setting, or give the dimensions for a boiler setting?

Mr. ALLEN—Yes, sir; and that is a very important thing. And, by the way, gentlemen, speaking about the connections to the boiler, you have a case in point in this recent explosion at Jersey City. I do not know how closely you have followed it, but the accounts given in the public prints are very often garbled, and they come to us in such a shape that, unless you have some personal knowledge of the case, you are left in ignorance of some of the most important facts. In the case at Jersey City, the safety valve attached to the boiler was a trifle small, according to the United States official regulations on the subject, and they are the only official ones in this country. The safety valve had a diameter of about $2\frac{1}{2}$ inches. Instead of the valve's blowing out freely, there was a pipe that conducted the waste steam to the open air, and that was only an inch and a half. So that there was a safety valve $2\frac{1}{2}$ inches in diameter, and in connection with that a pipe that reduced its effective area to an inch and a half, besides the friction of the elbow and the pipe, and the placing of stop valves between the safety valve and the boiler. That is another common error in the equipments of boilers. We had a very violent explosion in Newark within the last year at Balbach's refinery, resulting from that. They had placed the steam gauge connection on the main line of pipe, and the safety valve also on the same connection, and two stop valves—two valves by which the steam could be stopped off between the boiler and the safety valve—and when they were shut off there was no means

of knowing what pressure was on the boilers. The safety valve connection was on the branch pipe between the two boilers, and between that connection were these stop valves that I speak of, so that the pressure accumulated to a dangerous extent, until it reached the limit of the strength of the boilers and both blew up.

Mr. DENTON—In this boiler specification that I mentioned as having been put forth by Mr. Lavington Fletcher, I noticed that considerable emphasis was laid upon having room enough between the boiler and its walls or the walls of the setting to allow a person to walk around the boiler and get at every part of it. In contracting for boilers in this neighborhood, I have known that idea to be spoken of as detrimental to economy. What is the fact in the case? Is economy so effected by having room for walking alongside of the boiler as to make it worth while to build the walls in close to the boiler?

Mr. ALLEN—That is a disputed point, Professor. The recommendation of the inspection companies is to have a suitable space all around the boiler so that it can be inspected. Probably on first getting up steam all that space has to be heated at the expense of the fuel. After that is once done and the boiler put into operation, there is very little loss from that account. We think that there is no appreciable loss, and that the gain is so great that all boilers should be set in that way to make them accessible.

Mr. DENTON—Then if a drawing were presented by a boiler user, showing the walls of the setting to be within four inches of the shell of the boiler, the company would not hesitate to advise him to make that twelve inches?

Mr. ALLEN—To make that of such a distance that an inspector could crawl around that and get to the riveted seams—twelve or fourteen inches—get to the girth seams and the shell of the boiler.

Mr. DENTON—When the boiler user had set his boiler ready, would the company assist him in the selection of a competent fireman?

Mr. ALLEN—A few of the larger cities have municipal inspections; and before a boiler can be run it is necessary to obtain a certificate of inspection from those authorities. It is contrary to law to run a boiler without it. That is the case in New York and Philadelphia, and I believe Brooklyn, and in other cities in the West and the same in the East, and Boston, perhaps. The company, on the

application of the assured, will always give any information. They do not interfere in the matter. If the inspector has any reason to believe that there is any carelessness or negligence in the management of the boiler or machinery, or such other things as we have charge of, he ascertains as to the capability of the man, and that is included in his report.

Mr. DENTON—This question was based on the custom in large manufactories—for instance, Hoe's Printing Press Works—of recording the name of a man who is capable of running a printing press as soon as he gets out of work; and people get into the habit of applying to Hoe for a competent pressman. The question was put to learn if that practice was encouraged by boiler insurance companies—that is, their suggesting the names of good firemen, or attempting to keep themselves posted as to where a good fireman could be obtained.

Mr. ALLEN—It is done to some extent, not by the company, but by its employes. A man, known to be a good man, having been employed at some place where the company has been insuring and inspecting, will come to the company's office on getting out of employment and leave his name with the company, and ask to have the privilege of referring to the company. The company never give any written recommendations to any one. What I described has been done to a limited extent.

(To be Continued.)

A SUGGESTION.

Why not have an athletic association bulletin board? By that, we mean a board on which athletic matters and notices can be posted, without danger of being pulled down; quite a number of notices on this subject are mislaid or waylaid, before all have had a chance to see them. Under the present system, all official notices are put under the glass of the now universal board, very much on the plan of a shingle roof—one part overlapping another—very often covering it altogether. Again, to get a notice under the glass case, you must hunt up one of the janitors, or pin it fast to the frame of the glass door, the said frame looking very much as if it had attempted to stop a charge of shot, with indifferent success.

We would like to see a neat board put up somewhere in a place where all could see it, and on which nothing but athletic notices should be posted.

ATHLETICS.

REGULAR MEETING OF THE S. I. A. A.

In accordance with the constitution, the first regular meeting of the term was called October 1, in Prof. Thurston's lecture room. The meeting was called to order at 2.15 p. m., with President W. S. Dilworth in the chair.

The three upper classes were very fully represented among those present, who occupied the centre of the room, while the standing room was pretty well occupied by members of the Class of '88, who had dropped in to witness the proceedings and to see that they were duly elected members of the association. Several familiar faces of the Class of '84 graced the assemblage, and Messrs. Kletzsch and Maury showed several times that their interest was still alive by taking part in the discussions.

Their longer experience and superior knowledge added much to the weight of their advice.

Clerk O. H. Baldwin, of the Board of Directors, reported for that body, stating that they had not been able to rebuild the track at the grounds during the summer, as financial provision for the work was wanting and the treasury could not well be taxed to that extent in its present condition. He had received an offer, however, from a contractor to build the track and sod the base ball diamond for \$150. A committee was appointed to confer with the Hudson County wheelmen, to see if an arrangement could not be made with them concerning the track. Several games of foot ball have already been arranged, and eight colleges are yet to be heard from. The treasurer reported \$21.65 in the treasury, with rent from the St. George Cricket Club yet to come in and all the fees from members, which will put the association on good footing for the coming foot ball season.

The election of officers was next in order, and resulted as follows:

President: R. H. Rice, '85.
 Vice President: Burchard, '85.
 Recording Secretary: Abbey, '85.
 Corresponding Secretary: Collins, '86.
 Treasurer: Field, '86.
 Directors: Dilworth, '85; Adriaance, '85.
 Base Ball Captain: E. Munkwitz, '85.

An alteration in the constitution was also made, providing for the election each year of

a lacrosse captain, and he is also to be a member of the Board of Directors.

R. Norris, '85, was elected lacrosse captain for the ensuing year.

It was proposed to make a charge of admission to the foot ball games for members, but was ruled out of order, as contrary to the constitution. A written resolution was handed in, signed by Baldwin and Adriance, to that effect, to be voted on at the next meeting.

It was also agreed to add 25 per cent. to the dues if not paid before November 1.

The meeting adjourned at 4 p. m.

STEVENS vs. YALE.

The foot ball elevens of Yale College and Stevens Institute met on the new foot ball grounds at New Haven, Saturday, Oct. 11, in the presence of about 500 spectators.

The contest resulted in an easy victory for Yale, although the score did not reach the much coveted 100 points.

Yale put the following men in the field :

Rushers: Corwin, Robinson, Peters, Storrs ;

centre : Flanders, Marlin, Bertron.

Quarter Back : Bayne.

Half Backs : Terry and Goodwin.

Full Back : Richards, captain.

Stevens team were as follows :

Rushers : Cotiart, Burhorn, McLean, Kletzschnig, Hart ; centre : Brownell, Munkwitz.

Quarter Back : Maury.

Half Backs : Baldwin (captain), Gibson.

Full Back : Glasgow.

The game was called at a few minutes past three o'clock ; Stevens having won the toss, took the wind in their favor. Yale started by kicking off.

In two minutes Yale succeeded in obtaining a touch down directly behind the goal posts, but failed to make a goal from an easy kick. After the ball was again kicked off by Kletzschnig the ground was hotly contested for five minutes, when Yale got the ball from a scrimmage and carried it barely over the line, where a maul in goal ensued, in which Yale made a touch down. A goal was obtained from this, and two more touch downs for Yale followed, but in each case they failed to kick a goal.

Here followed some better work for Stevens, and in one instance the ball reached Yale's twenty-five yard line and a down for Stevens was made there. Yale began to work desperately now, and by a fine run and quick dodging Terry obtained a touch down, and from this a goal was kicked. The first half was

finished with three more goals from touch downs for Yale.

Play was called for the second half at 4.13 p. m. The second half was characterized by stronger playing on Stevens' part, Baldwin and Kletzschnig making some good plays and the rush line blocking harder. Gibson made some good catches, obtaining free kicks. Terry made several good runs, dodging in his peculiar way most effectually. In this half, Yale secured five goals from touch downs, two goals from field kicks, and Stevens made one safety. Baldwin tackled sure, and usually threw his man. Kletzschnig's long kicks at the proper height attracted much favorable comment.

A very noticeable point in Yale's playing was the closeness with which they followed each other up, several always being ready to receive a pass.

The score was :

YALE.	
Goals from touch downs.....	10
" " field kicks.....	2
Touch downs failing goal	6
STEVENS.	
Safeties.....	1
YALE.....	96
STEVENS.....	0

UMPIRES.

YALE, E. M. Schultz. | STEVENS, W. S. Dilworth.

PRINCETON vs. STEVENS.

On Wednesday, the 15th inst., Stevens Foot Ball Team played the first game of the season on their own grounds. Their opponents, the Princeton Team, although victorious, found it necessary to work extremely hard, and then were only saved from defeat by good fortune. Each college had nearly its strongest team in the field, the players being as follows:

Stevens—Rushers : Cotiart, Adriance, McCoy, Dilworth, Hart, Burhorn and N. Campbell.

Quarter Back: Munkwitz.

Half Backs: Baldwin (captain) and Kletzschnig.

Back: Maury.

Princeton—Rushers: Hodge, Irvine, Fine, Adams, Bird (captain), Harris and Green.

Quarter Back: Worthington.

Half Backs: Lamar and Baker.

Back: Toler.

The decisions of Mr. Storrs, of Yale, who acted as referee, showed impartiality and the best of judgment, and Stevens' umpire, Mr. E. Schultz, was a model.

The game was called at about 3.30 p. m., Kletzsck kicking the ball rather low and to one side of the field, so that Campbell caught it and at once started toward Princeton's goal. Before he had gone many feet, however, he was thrown by a Princeton rusher. Kletzsck made a good kick, and was answered by Lamar with a long high kick, which landed the ball near Maury. Our full back proved equal to the occasion, and dropped on the ball in most approved style. Baldwin sent it a little beyond the centre of the field, and owing to the fumbling of Lamar, Campbell secured it. Kletzsck then made several good attempts to force through the Princeton rush line, each of which forced the play a little closer to the enemy's goal. Baker unsuccessfully attempted a catch from Baldwin's high kick, and Burhorn by a quick pick up and a couple of good dodges succeeded in placing the ball between himself and the ground just back of the Princeton's goal line, but the referee allowed the claim of "interference" and Baker was given a free kick.

Princeton's half backs now tried running with the ball. Lamar, with excellent dodging, carried it from the 25 yard line to the middle of the field. Several times Lamar and Baker tried to get nearer to Stevens' goal, sometimes gaining a little and at others being forced back. The latter finally succeeded in gaining a quarter of the length of the field, but was thrown to the ground with such force by Baldwin and Cotiart that he was unable to continue playing for several minutes. The ball was carried by Kletzsck back to the centre of the field, and shortly afterward Lamar kicked it well down toward Stevens' goal line. Kletzsck tried to catch it, but only succeeded in touching it with the ends of his fingers, thus changing its direction so much that Maury, who was running up for it, had to go back nearly to the goal line, where he picked it up and kicked it. The ball striking one of them, bounced back over the goal line, and as a Princeton man reached it first, he secured a touch down. The trial for goal, however, failed.

After the ball was kicked from the 25 yard line, a good run by Baldwin, and another by Cotiart, in the latter case the ball being splendidly passed by Munkwitz, forced the play close to Princeton's goal. After making a touch in goal, Stevens' opponents succeeded in taking the ball nearly to the centre of the field, when time was called.

The second half was very much a repetition of the first. Princeton's big centre rusher,

who seemed to be the pet of the team and was familiarly called "Jim," had the ball passed to him quite frequently, but his weight and strength were not half as successful as the dodging of Lamar and Baker.

Much of the time the ball was between Stevens' 25 yard line and the centre, but several times it was worked dangerously near Princeton's goal. Twice Baldwin and Kletzsck both tried to catch the same ball, and as a result, both missed it; but fortunately no great loss was experienced as a result. Burhorn was slightly injured toward the close of the half, and Kletzsck took his place in the rush line, Campbell playing half back and Greenebaum end rush. The latter did some very swift running, spoiling a kick by Lamar several times. This, with good general playing, brought the ball to Princeton's 25 yard line, where it remained a few minutes, and was then gradually worked to within six feet of the goal line, when time was called. No expression of what might have happened if the play had been for 45 instead of 35 minutes are necessary, as the facts remain the same, the score standing, Princeton one touch down, or 4 points, to Stevens 0.

The playing of all the members of the team was very satisfactory, and the experiment in placing the men was fortunate. Munkwitz with practice will make an excellent quarter back, and Dilworth's place is certainly centre rush. One of the weak points in our team was the way in which the Princeton half backs were tackled. Lower tackling and following up the man after he had dodged would have been more successful than, after having been passed, turning and watching for the next man to do the work. Otherwise the tackling of the team was excellent, Campbell, Adriance and Cotiart deserving particular mention. The team would find it advantageous to practice passing, so that the work in a game may not only be better done but divided more. If the end rushers can get the ball every time it is thrown to them, they have a much better chance of gaining ground than the half backs, and being almost on a line with the original position of the ball, the risk of losing is a minimum.

If players who are not on the team will give it the much needed practice, we may make a good record this year at foot ball.

Suspenders for college breeches is a Junior's definition of faculty.—*Dartmouth.*

STUFFING BOX.

Where is our Grand Stand?

Remember! "Fen collectin' in groups" this year.

A college pin is one of the things to be settled this year.

Has Stevens any trustees—*i. e.*, outside of the catalogue?

Overwork in the Chemical Laboratory is a sore question with '86.

Let the subscription to the Bartholdi pedestal fund be a liberal one.

The Glee Glub promises to be a greater success this year than last.

'86 thinks Sir William Thomson didn't thoroughly appreciate their fine work.

Bass, formerly '86, has returned from South America, and is continuing his studies in '87.

Membership tickets of the Athletic Association will be changed in color each year to avoid confusion at the gate.

'86 lost its pet watermelon, didn't it? Too bad! But never mind, '85 enjoyed it and returns many thanks for the treat.

'88 numbers fifty-three men, most of whom, even this early in the year, have established their reputation for "unwashed" gall.

The bulletin board must pay a large percentage to some one (not the janitor, of course), for those "gentlemen's apartments for rent" notices.

"Say, fellows, we didn't have our best team at Yale, did we? But when we played Princeton, who would have thought Stevens could have braced up so in one half week."

Where is the waste paper basket that belongs in the corner of the sanctum? It can be recognized as being modern and more artistic than those in general use about the Institute.

Serrell, '86, had a severe fall from his bicycle early in the summer, breaking his arm and cutting and bruising himself considerably. He is now under the care of a surgeon and is progressing slowly.

Politics in Stevens show a large Republican majority. As near as we can obtain, the total figures amount to Republican, 105; Democrat, 63; and there are still to be deducted several of the latter, who favor protection.

Some one informs us that Prof. Leed's dog has been named "Donald," after our good janitor. Now, if this is so, we editorially suggest something more appropriate, either "Jersey Lightning" or " C_2H_6O ."

The Freshmen have accomplished that all important matter, the election of officers: President, McCoy; Vice-President, Whigham; Secretary, Isaac; Treasurer, Echeverria; Editor for THE INDICATOR, H. S. Wynkoop.

A Freshman wants to know if the signs "To Let" on trees along Hudson Street mean that roosting accommodations can be had there. If so, he would like to rent one, where he could study "Fowler" to advantage.

Up to the time of going to press '86 has held no elections. Probably the Juniors are still suffering from an overdose of watermelon administered during the Preliminary Term, and haven't returned to things earthly.

This year a touch down failing goal counts four points; but a goal from touch down six, as last season. This arrangement gives team work the larger proportion of the score and not individual playing, as was the case last year.

When Penna. University played here last fall, thirty-one heavy, broad, long and thin fellows passed through the gate as "Team." We publish this for the benefit of those who accompany our team on November 8 to Philadelphia.

'85 held its election promptly in the early part of the term. The officers for the ensuing year are as follows: Pres., H. D. Williams; Vice-Pres., W. A. Adriance; Secretary, J. M. Rusby; Treasurer, A. U. Burchard; Historian, C. A. Pratt.

The two changes in text books this year are Trigonometry for the Freshmen, they using Wood's edition, and a revised edition of Shaw's Literature for the Sophomores. O, happy (?) Sophs! Shaw was bad enough last year, but to revise him—

A member of the Institute received a very severe blow in his eye while playing foot ball. As he was just returning to consciousness, his

uppermost thoughts were revealed by his muttering: "Guess I can work this on the Faculty for two weeks. Ah!"

A stormy meeting of the Sophomore Class resulted in a general change of officers. The following men were unanimously elected for the year '84-'85: President, R. N. Bayles; Vice President, J. Day Flack; Secretary and Treasurer, Jas. A. McElroy; Historian, R. M. Anderson.

The fence at the athletic grounds is in sad repair in several places. It suffered considerably the day Smithson was allowed the use of the grounds, and there is no reason why he should not be made to share the expense of repairing it.

Lord Du Asiplease, known in the United States as Smithson, has a strong tendency to lord too much at the grounds. He takes his Christmas present and "free days," probably forgets about them next day, and resumes his role of potentate of "St. George's Field."

Dr. Everhart has taken the chair of Professor of Chemistry at University of Texas. We take this occasion to express our regret in losing so pleasant and thorough instructor, and wish him the good share of success in his new undertaking which he so richly deserves.

There was a fence built near the High School, presumably for the purpose of keeping the Preps. within their own proper bounds. But the Preps., like all animals of their species, must needs roam at large over the campus and claim most of this part of the globe for a pleasure ground.

A bicycle club was organized last year; but this year there is no club, for says its chief: "We organized last year, but our club requires an *organize* each year, and for this reason we have none. *Ed.—Organize* in this connection means a new supply of collar bones, legs, arms, heads, etc., to fill *vacancies*."

The political arguments of the Hoboken *Advertiser* are truly chilling, especially those in which the sublime effort of belittling our voting strength in the eyes of the people of Hoboken is attempted. Not unlike some sublime efforts of like order, which have passed into history, they assume the very distinct shade ridiculous.

The percentage of loss in the different classes tallies very closely with Prof. Wood's estimate, which he always provides the Fresh-

men with. The loss in '85 was about 15 per cent.; in '86, about 23 per cent.; in '87, about 20 per cent. Now, Freshies, here is an interesting table to examine at your leisure, but it will cause no alarm if you have courage enough to work *hard* and *faithfully*.

To be polite and not cause any ill feeling, we ask our friends, the alumni, to turn to some of our back numbers and read over our request for alumni contributions. We cannot reprint the request, and, therefore, merely ask that they duplicate our earlier expressions in regard to the matter; it may suggest to some the picture of an empty pigeon hole in our sanctum labelled "Alumni Contributions."

The foot ball team has not been definitely settled upon as yet, but there are a number of candidates for positions who are in hard training. The following, if not exact, may show somewhat who are to represent Stevens this season:

Rushers: Burhorn, Kletzsch, Hart, Cotiart, Campbell, Adriance, McCoy.

Half Backs: Baldwin (captain), Brownell, Kletzsch or Campbell.

Quarter Back: Healey.

Full Back: Glasgow or Maury.

The average weight of the rush line is 170½ lbs.

Stevens is always upward and onward, patriotically speaking, but the last rise in the appearance of another publication—"The *Eighty-Four*"—is surprising, and our query is, can Stevens, or still less, can one class support two college papers? And then have our friends in '84 so soon forgotten that the life of THE INDICATOR depends as much on their contributions as any; and why throw them into other channels, where none can profit but '84? Selfish is the most suitable word to express our opinion. Let us all know what you are doing, for you may rest assured we shall never lessen our interest in your class.

Scene.—Area way between shop and laboratory. A Junior, a string to the lecture room in the second story of the laboratory, and a small Hobokenite comprise the principal actors.

Junior—Now, here! you hold on to the string and wait until I pull from above. Then you go right through this side door and stand on that yella' dog's tail until he howls. See?

Hobokenite—I'm your size, but gimme me cent now!

Junior completes the bargain, calculating inwardly: Now Prof. can't hear a recitation and hear his dog "James Donaldson" howl at the same time; so if I get stuck I'll pull the string, "James Donaldson" howls, Prof. distressed on account of James D., hesitates; then comes my chance to use those golden moments in perfecting my imperfect knowledge of the question asked; this finished, I pull string twice, dog stops howling, and I find myself in the elysium of a "Correct, sir," from Prof.

The Republican Club of the Institute organized early in the fall with the following officers: President, McCoy, '85; Vice-Presidents, McLean, '85, Chester, '86, —, '87, —, '88; Secretary and Treasurer, Adriance, '85; Captain, Hart, '87. The club made its first appearance the night of the Republican parade in Hoboken. About sixty men turned out, and through the exertions of Capt. Hart made a very creditable display. The Blaine cheer was a great feature, and was received with a becoming overflow of patriotism all along the line. Our friends, the Fourth Warders, argued persuasively with bricks, dirt and other pointed remarks, but we proved to their entire satisfaction that stout canes were preferable, and that their cause must fail. The club was received in a more warm hearted way after we left the "Fourth" and got on high ground. The decorations about the town were profuse. Prof. McCord's house was brilliantly illuminated. Prof. Thurston did not illuminate, but as the club passed he gave sufficient evidence of his sympathy.

PERSONALS.

'76.

ALFRED R. WOLFF, of the firm of Weightman & Wolff, consulting engineers, is now carrying on the business alone, his partner retiring.

'82.

ADDISON A. RIGHTER is situated at the Yantic Woollen Mills, Connecticut.

'83.

MORGAN BROOKS is now with the American Bell Telephone Co., Boston.

JAMES E. SAGUE is with the Chicago, Burlington & Quincy R. R. at Aurora, Ill.

'84.

WM. S. ALDRICH is in the draughting department of the Ball Engine Co., Erie, Pa.

JAMES BEATTY is Professor of Mechanical Engineering and Astronomy at Haverford College, Penn.

WM. H. BRISTOL is still teaching in New York City.

SAMUEL P. BUSH is in the shops of the Chicago, St. Louis & Pittsburgh R. R. at Logansport, Ind.

RICHARD L. FEARN has become a partner in the Atlanta Engineering Company, Atlanta, Ga.

E. H. FOSTER has a position in the testing department of the Worthington Pump Works, Brooklyn.

H. L. GANTT is with Poole & Hunt, turbine manufacturers, Baltimore, Md.

DAVID S. JACOBUS is assistant instructor to Prof. Denton, at the Institute.

ALVIN P. KLETZSCH is assisting Prof. Thurston in the Mechanical Laboratory.

BENJ. W. TUCKER has a position as draughtsman in the Newark Filtering Company.

JOHN VAN VLECK is draughtsman for the Edison Electric Light Co. for isolated lighting.

CHAS. W. WHITING is in the engineering department of the P. & R. Coal and Iron Co., Pottsville, Pa.

THE COLLEGE WORLD.

COLUMBIA.—The class of '86 have added racing to their other accomplishments. Last month ponies owned by two members of '86 came in respectively first and second at the Morristown, N. J., races.—Columbia has lately lost two of her trustees by death.—The old crown, which in the time of George the Second surmounted the old college buildings, has been placed in the present college library.—It appears that some members of

the foot ball team were practising during the summer at the Catskills.—No students have left Columbia to join other colleges this year.—The trustees of the *Spectator* Publishing Company having just declared a dividend of ten per cent.

HARVARD.—The *Advocate* has an editorial condemning the "disgraceful treatment which certain visiting teams experienced last year at New Haven." The editors evidently intend to stand up for the "lambs." However, Yale's conduct was not what it should have been on those occasions.—A valuable collection of meteorites has been added to the museum.—Harvard has now a canoe club.

YALE.—The foot ball players have done some good work in practising this fall.—James G. Blaine's son and Grover Cleveland's father are graduates of Yale.—This year's Yale choir is the best for years.—Yale mourns the loss of many athletic spirits.

WILLIAMS.—The Blaine and Logan Club is in a flourishing condition.—H. A. Garfield is president of the Class of '85 and also editor-in-chief of the *Athenæum*.—Certain members of the Faculty have signed a paper pledging themselves not to vote for Blaine and Logan.

IN GENERAL.—It is estimated that nine-tenths of the college students in this country are Republicans.—The Princeton rush resulted in a draw.—Prof. Sylvester, an American scholar, lately at John Hopkins University, but now at Oxford, is declared by English men of science to be the greatest living mathematician.—Lehigh University has received numerous additions to its buildings this summer.—The new gymnasium at Lafayette College is now completed.

EXCHANGES.

During the summer vacation some of our engineering exchanges, all of which are highly appreciated, have appeared regularly, while others have favored us occasionally, so that the examination of our summer mail disclosed an unexpectedly large amount of valuable matter. Some old college exchanges we have

not yet received, but their arrival, the renewing of old acquaintances as well as making new ones, of which we hope there may be many, and the benefit to be derived from mutual friendly criticism, are anticipated with pleasure.

For only one of several new arrivals have we a word in this issue. The first number of a paper published by the Class of '84, and called *The Eighty-Four*, was received a short time ago. It is to contain as its main feature "a letter from each member of the class at each issue" and abstracts from papers delivered by members of the class before the societies of mechanical, civil, mining and electrical engineering," etc., as secondary features. The latter will probably be quite secondary for some time to come, and if they should deserve prominent mention, we fear it will be some time after the demise of "*The Eighty-Four*."

The principal feature can never be carried out; not even in a classical college, where much attention is given to literary work, could such a plan be successful. How absurd, then, in a college like Stevens, where literary training is unfortunately so much neglected, to attempt to carry out any such plan. The interest in the Class of '84 and in the College which is indicated by the *The Eighty-Four* might better be directed in some other channel.

CHIPPINGS.

Full many a maid has toyed with kerosene,
And sailed to glory in a gorgeous glare;
Full many a man has poked at glycerine,
And flown promiscuous through the desert air.
Ex.

Senior asks professor a very profound question.

Prof.—"Mr. W—, a fool can ask a question that ten wise men could not answer."

Senior—"Then, I suppose that's why so many of us flunk."—Ex.

"When does school commence again?"
The Freshman turns up his nose and says he does not know. The Sophomore laughs uproariously and does not answer at all. The Junior smiles politely, and explains that they generally say college here; but answers promptly, "next Thursd
Record.

* the * Stevens Indicator

Vol. 1.

* November, 1884. *

No. 8.

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* Stevens Institute of Technology. *

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The writer's full name, as well as his NOM DE PLUME, must accompany the article, as assurance of good faith and reliability; but it will not be published, unless desired.

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"THANKSGIVING!" and most of us will take the few days given us, as a matter of course, without giving one thought as to the significance of the day. Why cannot we be thankful? Have not we reason to be? Let us sum up a few *thankfuls*. To those who go home, it means a grateful change of diet, for Hoboken means German (bad quality), and Hoboken boarding house means no end of mystery, the like of which has never been known to exist. Besides, we are thankful that the Faculty and ourselves are still on speaking terms; that our prospects for staying are bright;

our janitor has taken down the boarding notices; that we have a library of even

questionable usefulness, and thankful to overflowing that we are not Preps.

To all of us the "days of grace" will be a pleasant relaxation from the thoughts of turbine, complications in mechanics, etc., etc., and the fact that we can talk United States for three days at least ought to make us thankful. Is it not truly a blessing to have even so brief a rest?

WE are sorry to part with our fellow editor, Mr. Ladd Plumley, who has been called away from college since the organization of the Board of Editors for this year. He had just commenced his second term's work on the Board when he was obliged to leave; and the efficient service he rendered the paper has left with us a pleasant remembrance of his abilities. We wish him success in whatever he undertakes, and hope to meet him again.

OUR foot ball season up to date has been, to use the language of the chronic growler, "a miserable failure." And why, we ask. "The management is bad; one man wants to run the whole association," and so on; these complaints are as varied as the dissatisfied has minutes to pour forth his grievances. Now, friend growler, first remember that from the builders of a steam engine down to the less important item of running a *team* formulæ won't always fit, and it is necessary frequently to use what is known as practical experience.

A graduate of Stevens tried to design a valve some time ago from formulæ, which were guaranteed not to fail, but his engine would not run, and it was necessary to consult with experienced engineers before he could make any progress.

You growl at the inability of the directors of the Athletic Association, and feel satisfied that the correct way to bring them straight is to censure, and, like the small boy, "if you won't do my way, I won't play."

Messrs. Growler, you never played a game of foot ball; all you do is to walk around the edge of the field and theorize as to how and where such and such a player should have been at a critical moment in the game, and you invariably prove (to yourself) that the player doesn't know the game, and that some one else should have been in the team in his stead. Satisfied with this course of reasoning, you begin in your head to remodel the whole team. You construct probable curves and no end of improbable ideas, and now your ideal athletes are ready. Fortunately the genii growler is scarce in the Institute; but still he is there, and we want to say to such that the proper way to improve our efforts in athletics, in anything, is to give it your hearty support.

If you think you have a good idea, give it to those who can make use of it; don't hug it up and suffocate it with unreasonable complainings.

If every Stevens man would stand out and support the officers of our associations, there would be no lack of push and improvement.

IT would seem well to reiterate some of our hints and suggestions of last year, not only for the benefit of the new class, but for a certain possible fact. There may be some who have been nourishing up some cherished plan, suggested by the wants of the students, and who are only waiting to see that those wants are still manifested. We doubt not that these persons, on learning that we are really in earnest, will immediately do for us that which they propose for our benefit.

Of prime importance to the students is a gymnasium. We have often lain awake at night thinking of the great possibility of Stevens having an extension to one of the wings of the building, the first floor of which

should be the finely equipped gymnasium, which we have so long thought of. This could also be used as a lecture hall, furnished with a piano, where we could have meetings, where our Glee Club could practice and give us the benefit of that practice; where, also, we could have occasional lectures by noted men, for the good of every one connected with the College. Then, on the second floor, we would have a library and quiet reading room, where no loud talking would be allowed, and where there would be every facility for getting at and consulting valuable books of reference. Now that the Treasurer's office has been moved into the Institute building, we are deprived of the reception room. Our different special committees have no place to hold their meetings, so that on this second floor we should provide a reception room to fill the loss.

There, is that not a pleasant picture for contemplation as we go on with our work this year? "Yes, but a useless dream," some one replies. No, not so much of a dream, either, for we are sure that the proposed extension is but a matter of time in such a place as Stevens. Neither is it useless to think of it, even if only a dream; there was an old proverb, "Disappointment sinketh the heart of man, but the renewal of hope giveth consolation;" especially the latter clause applying to our case. And as to the renewal of the hope, THE INDICATOR will continue to renew it at choice intervals. Students of Stevens, as you come up the street past our handsome building, and enter at the side door, just pause a moment outside and try to imagine how our proposed extension would look, and throughout the day try to appreciate how it would *feel!*

We wish that the students would appropriate our columns for discussions on these matters. Comment on our suggestions and tell us what you think of the plan, and how it could or ought to be brought about. It will then go to prove to every one that the extension proposed is wished for and needed, not by a few, but by every one at Stevens.

OUR CATALOGUE.

"My son, I did not know that you had been dropped last year. I don't understand it at all. Why, did you keep this from me?" "Why, father, I haven't been dropped. I am still in the same class." "My dear boy, do not add a *lie* to your other faults; if you have done wrong, there is time to rectify your mistake, for you are yet young; but do not cover up your misdeeds by lying."

"If you will only listen a moment to reason, I will explain: it's all a *mistake*; I *haven't* been dropped at all. Where did you get your information from? Oh, our catalogue! Why, didn't you know that the annual catalogue is always printed that way? Just about the time when a student gets to be a Sophomore he is printed as a Freshman, causing, as you see, frequent errors. There, as you perceive, I have explained how it is that you thought me still a Freshman. I'll tell you a funny story about the way that catalogue was used to convince the captain of an opposing team of foot ball players that a disputed man was really a Freshman. You see, he complained that one of our men was a Soph. 'Oh, no!' said we, 'he is listed in the annual catalogue as a Freshie, and we guess the Faculty know what they are about, and knows who's who.' You see he could not go behind that, and therefore we had him."

ON TIME.

THE IMPORTANCE OF THE STUDY OF LITERATURE.

That there should exist in the mind of one who seeks a high place in this world the belief, or rather the idea, that there is little profit in the study of Literature, is in itself an astonishing thing. That one who is striving to reach that high position by first securing the strong foundation of a good education should have the least doubt of that study's importance, is lamentable. Why is it an important thing not to neglect the study of literature? To this question let us now devote ourselves.

The literature of a nation is the speaking record of the people's life. It is not mere history, which lays down bare facts and occurrences; it is the living voice of a people who have lived, thought, and spoken in this same world, and who have had that very experience

which we must all go through as we live. Men who succeeded or failed, and have passed away into the same end—eternity—have left here on earth a complete representation of the souls, the bodies, even the dresses and surroundings, of those who lived with them. They have so written it down, that we seem to hear and see and feel a living people, both wise and foolish, gay and sad, fortunate and unfortunate. Every one esteems it a happy lot to become acquainted with a great man, to converse with him, and learn his ideas. But it is the privilege of the student of literature to be brought face to face with many great men, to have opened to him their whole hearts and minds, and he is profited thereby a thousand times. To succeed in human affairs, it is necessary to know human life. How can this be done better than by looking at the past?—not by simply reading what man has done, but by going back and personally observing what he thought when he did it, and what others thought while it was being done. The soul of man needs sympathy. It would be impossible for one, isolated from the thoughts and opinions of others, and ignorant of the customs and needs of humanity, to accomplish anything that would make his life a success and give his name to the age in which he lived.

It is presupposed that the study of literature is of prime importance to one who intends to lead a literary life. Though not quite, perhaps, so important to the scientific student, its omission is not for one moment to be thought of. First, we may need to write; indeed, if we attain any prominence in science, it is necessary that we should give our thoughts on paper for the benefit of those around us, and those who shall come after. Grammar, rhetoric, and logic are not sufficient for this. We too often hear it said that scientific men cannot describe, to the satisfaction of their readers, their own researches and inventions. By seeing how others before us have written and expressed their ideas, we may learn how to shape our thoughts into presentable form. When Stevenson invented his locomotive, he did not create it out of his own mind; he took Watt's principle of the double acting engine, Blackett and Hedley's smooth driving wheels, Seguin's tubular boiler, and so made his "Rocket," the parent of our present locomotives. So it was with Shakespeare: he presented his own original conceptions, but in the form by which many others had profited. We thus learn to write in an easy way,—easy both for us to compose and for others to read.

In our later years literature will be a great source of pleasure to us. In conversation, one who is able, unassumingly, to quote liberally from literary sources, proves himself invariably a most interesting and agreeable companion. When thoroughly conversant with literature, he can, when talking to those of limited literary knowledge, adapt himself to their attainments and express his opinion equally well on whatever authors they may have studied. Then, too, most of us hope, when our hard work has merited our taking the time, to enjoy ourselves by reading. Here it is that a knowledge of literature points out to us the best paths to pursue; for, having travelled the highways of literature, we are privileged to stroll along the by-ways, where are to be found hidden wild flowers, rather than the more showy flowers of general cultivation. So, having dwelt upon the greater writers, we learn to read those of lesser fame and weaker force, how to pick out their defects, and where to find their special beauties. But some may wish to devote their reading hours to a particular branch; one of us, for instance, desiring to follow writers on some particular science. In such a case it is still an advantage to have studied the standard authors on all other subjects; it helps us, by comparison, to appreciate our chosen authors and their themes. This does not mean that we thus depreciate any of the others, but that we learn the distinguishing features of those which we have selected, and the position which they occupy in the great whole. In here we might bring the saying, "One cannot appreciate home until he has travelled abroad."

In studying the subject of literature in college, it is not expected that it should be learned by heart, as if it were a book of rules. We are not to memorize what is contained in a given text book, but to become familiar with its contents. To know the history of a nation's literature, remember the names and position of the representative authors, the particular events of their lives, their chief productions and their effect on the language; to do this is the principal labor connected with the study. The minor writers seem to collect themselves around these great lights, and, with little effort, these also can be remembered and rightly placed with their respective writings. That which we thus learn in college gives us an idea how to take up the study, in a more extended way, at some future time. It suggests to us the works which it is

beneficial for us to read, as we get spare hours; it also shows us, by the various successes and failures of the different ones about whom we learn, that we must, if we wish to attain any literary fame, work, as in everything else, persistently and with our eyes wide open. Compositions are excellent in connection with the study of literature in college. The subjects, however, should not be on anything outside or in advance of what has so far been studied; they should be calculated to draw out the thoughts of the student himself on the ground gone over, rather than be a mere summary of lectures or readings.

Those who arranged the course of study in Stevens, wisely saw the important place literature holds, and so gave an entire year for its study. This length of time is absolutely necessary in order to obtain good results, for it is not a subject which can be hurried over, so many pages at a time. There has been some hard feeling against the study formerly, because it was presented in so unpalatable form, in the text book then used, "Shaw's Complete Manual," which, though in itself a masterly work, is too "complete" for our purposes. It goes too far into detail for a general study, and carries on some discussions until they become tedious from their very length. The paper, also, and especially the print, is very trying to the eyes. All, however, has this year been rectified; the use as a text book of "Shaw's New History" is an established success. The book contains, by a rough calculation, a little over one hundred thousand words less than the "Manual," and with the new type and arrangements of chapters and headings, makes an attractive and desirable volume. It is really a pleasure to read it, and therefore can hardly be much of a task to learn its substance.

We conclude, therefore, that it is of immense importance for us to study English literature, and nothing short of extreme folly would remove it from the curriculum of Stevens Institute, or encroach upon the time given for it.

ALBITAN.

MY INVENTION.

Ever since electricity became an important branch of science I have had a great fondness for it; and lately an experience which I had with this subtle force caused me to become forcibly convinced of the truth of the state-

ment that fortune does not favor inventors. I have spent many of my leisure hours for the last eight months trying to devise some way of preventing the frequent burglaries in these New Jersey villages, and the other day success seemed to have crowned my labor.

From the very first I worked upon the principle that what was needed was a preventive, not a cure; and it was in accordance with this belief that my final inspiration was brought about. I was reading the paper one morning, when my eye was attracted by a notice of an accident the day before. It seemed that a broken electric lighting wire lay on the pavement in the Bowery, and that a horse, in passing, happened to touch both ends at once. He was instantly thrown and seriously lamed. This was the spark in the powder. Seizing a sheet of paper, I rapidly sketched out a diagram of my invention. My conclusions were quickly reached. If I bought a small dynamo, run by a gas engine, and laid a circuit of uncovered insulated metallic strips around each window casing, no one would be able to enter there; but when I thought of the doors I was at first puzzled. However, I finally decided to place a metallic mat in front of the doors, and make the other wire to connect with the door knob.

At the first opportunity I took a vacation of three days, and remained at home arranging my circuits. At the end of that time I was ready; all that could be desired was a burglar to experiment on. Feeling secure, I grew careless. My watchman was discontinued; I neglected to repair a broken catch on the dining room window.

It was fully a week before I had any chance to test my "Electric Burglar Proof Attachment for Dwellings," but when the chance came, it came in a manner I had not dreamed of. It so happened that about ten days after I first started my dynamo I had occasion to remain late in New York, possibly all night. So that morning I took my wife down stairs and explained to her how to start the gas engine, and told her to be sure to have everything as she wished it to remain during the night before starting the dynamo. Finding my business not so urgent as I had expected, in the course of the day I sent the following telegram to my wife:

"Will be home to-night, late.—L. S. M."

According to custom, she would understand this message to mean that she should leave the front door unlocked; but I had not implied enough, as you shall hear presently.

The 11.10 express had left me at the station. There was no moon, and the air was chilly with autumn. The house was cold and dark, and as I walked up the steps my thoughts were far from my invention. I stepped forward and stood upon the mat, searching in my pocket for the key. Then, leaning forward, I put the key in the lock and touched the knob with the other hand. Without stopping to turn the knob, I retreated, took a flying leap down the steps, and almost broke myself in two over a flower urn. I was almost paralyzed; otherwise I should not have remained on the damp grass as long as I did.

In my extremity I bethought me of the dining room window, which was unlocked. I persuaded myself that with a little care I could enter that way. Cautiously I drew myself up to the level of the window and raised it. But here came a difficulty—I could not possibly get in without touching one of the strips. Would that be safe? Hastily recalling my somewhat limited knowledge of electricity to my aid, I considered it safe to make the attempt. I may state here that I am in the habit of wearing a watch chain passing around my neck; in the course of my exertions this had slipped up until it lay upon my bare neck. Is it any wonder, therefore, that in my great care lest my body should touch the other strip, I should forget my watch chain? It is needless after this hint to say that I fell out of that window with a large initial velocity, plus the acceleration due to gravity. The potential energy manifested itself in the form of heat and light, and the earth acting in a line directly opposite to my fall, produced an equilibrium so stable that I made no attempt to rise for a considerable length of time. Now, although some of your professors may doubt this statement, I solemnly affirm that two forces acting at the same time in directly opposite directions *may* produce rotary motion—of the head. I heard one of the Stevens boys make such an assertion once, but I did not believe it until this event which I am relating took place.

I now proceeded to wake my wife, and in a short time I heard a window raised, and she stood in full relief against a black background. In her hand was my old navy revolver. Without making any attempt to ascertain who was below, she calmly set about cocking the weapon. The rusty spring proved too powerful for her one hand, so she grasped the barrel firmly in both hands, catching the hammer in the moulding of the window, and drew the re-

volver toward her. When this, for her, extraordinary feat was accomplished, she turned the muzzle in my direction and proceeded to take aim. As she did this she leaned forward in her eagerness, at the same time resting her left hand upon the window sill, in contact with the inner strip of the "E. B. P. A. for D." arrangement. At that moment the ridiculousness of the situation flashed upon me. Here I was, kept from my own house by my own contrivance, and mistaken by my own wife for a burglar. I began to laugh, as well I might, for the revolver pointed at me had not been loaded in four years, to my certain knowledge, and, furthermore, I knew that the new system was giving complete satisfaction. Finding that the weight of the revolver made her hand unsteady, my wife rested her wrist against the side of the window. Immediately there was a strange sound, and the figure at the window disappeared, while the revolver rattled on the tin roof below.

Finally I persuaded my wife to stop the dynamo and let me in; whereupon I went to bed. I remained in bed all the next day, sending word to inquiring friends that I had an attack of rheumatism, in consequence of exposure to the night air. I felt ashamed to tell them that I was suffering from too much electricity.

Notwithstanding the severe tests to which my invention was subjected on that eventful night, I consider the system to have fully demonstrated its usefulness. The effects of fear upon the members of the household are marked. The servant shudders with superstitious awe as she goes to open the door, and the cat has forsaken his accustomed perch on the window ledge, while my wife and I are in continual dread lest one should make known the other's part in the farce. If outside parties can be made to share the dread which has taken possession of our family, we will no longer be disturbed by any nocturnal visitations.

C.

EDUCATIONAL REFORMS AND COLLEGE STUDIES.

[Alpha Delta Phi *Star and Crescent* for May.—Abridged.]

Conceding all that may be claimed for the American college in the past, there is a growing conviction that the time has come in the development of the country, when the college

must move forward by admitting important reforms; that it must broaden its curriculum; relax its traditional rigidity and surveillance; take on a temper and life more modern and scientific, less archaic and classical; that it must carry its students farther on in their chosen departments, and in all its work it must have constant reference to utility and the practical needs of the world's life.

The college of to-day is in a transition state. It is neither a grammar school nor a university. It occupies a position between the gymnasium and the University of Germany, combining qualities of both. For several decades there has been an expansion of the curriculum; the requirements for admission have been increased; the course of study demands more maturity of mind, and the average age of students is higher than formerly.

In former years, when the curriculum was simpler, boys entered college at fourteen and graduated at eighteen, so that at the age of twenty-two or twenty-three they had a fair start in their life work; whereas under the present requirements a college man who takes a course in the professional school reaches his first remunerative work at twenty-seven or twenty-eight, at least six years later than he who enters the professions without the delay of the college, and ten years later than the young men who enter the non-professional industries of life. Artisans, machinists, agriculturists, merchants and manufacturers have already given ten of their best years to their life work before the college man has ventured from his cloister upon the activities of the world.

It should be kept in mind that our college system is a heritage from the sixteenth century. It came down to us from what is known as the Humanistic education, which the Renaissance gave to England and Europe after the Reformation, and which still has control of the public schools, the gymnasia, and most of the universities of the old world.

The groundwork of the Humanistic system is language. Latin was the substratum and the classic the substance of all culture. The curriculum was exceedingly narrow. A little logic and rhetoric were taught; the sciences were as yet unborn.

It was a real revolution at Rugby, and almost kindled a rebellion when Arnold, as late as 1830, introduced the modern learning. When Stanley was a pupil at that celebrated school, he wrote: "Dr. Arnold has reformed the school in every way; he has introduced

history, mathematics, modern languages, examinations and prizes."

When Harvard and Yale were founded, there was reason in the respect shown to the classics, for it was a system fitted to the times. Latin was then the learned language and vehicle of highest thought and knowledge.

But all this has since changed. The classical curriculum is part of an order of things, which in other departments of thought has long since passed away. French, and more recently German, have won the place once held by Latin, and English is destined to supersede them both. We are in a different world to-day. The ancient world is going farther and farther from us, while the world of to-day, through the wonders of electricity and steam, is gathered about our very door.

It is the knowledge and mastery of this present world, and the times in which we live, that is indispensable to the leaders of the thought and activities of to-day.

It is not, therefore, to be wondered at that a spirit of restlessness has got hold of our colleges, and that several of those in the first rank are feeling their way toward important changes in their methods and studies.

There is a movement in favor of making science the basis of a liberal education instead of the classics, of giving more place to social institutions and forces, and of remodelling the curriculum so that the students may have specific references to their life work through the entire course. The movement includes, of course, the system of college electives, in which Harvard led off.

A conspicuous defect in the old system was its failure to recognize individual tastes and aptitudes. The curriculum was a procrustean bed to whose pattern all were stretched. Individuality of character was sacrificed to that *ignis fatuus* called mental discipline, as though any genuine study was not mental discipline. A fixed curriculum is well enough in the lower schools, where mental training is sought rather than information, but to continue it with students who have reached manhood and womanhood is like stopping soldiers in the conflict of battle in order to teach them the technicalities of military drill.

When individuality of character is sacrificed we are fighting against nature and sealing up the sources of power.

It is claimed by the friends of the new order that in the abundance of the studies crowded upon the student in these times, it

is the sheerest assumption to say that any particular study is indispensable to mental discipline, or that any study should be pursued with exclusive reference to mental discipline.

They claim for the sciences that the mastery of one or two departments of natural science would discipline nearly every faculty of the mind, the memory, observation, the judgment, the logical faculty, the powers of analysis and classification; and that if to these be added modern languages, social and political science, literature and philosophy, there would be no occasion for devoting the labor of eight or ten years to the languages of antiquity.

(To be continued.)

THE BRITISH RULE IN INDIA.

In 1593, as history relates, an English merchant landed on the western coast of India. He had been told in a dream that, within three centuries, his countrymen would become possessed of a territory equal to the continent of Europe, Russia excepted. He regarded this dream as the result of a disordered imagination. Nearly three centuries from that time the Queen of England was crowned Empress of India, and the dream was proved to be a prophecy.

British rule in India has been characterized by incompetency, cruelty, dishonesty, treachery, fraud. It is one of the foulest blots on the pages of English history. As in more recent cases of unjustifiable oppression, it was the domineering commercial policy of Great Britain—the notion that where Englishmen could gain wealth England had the power to rule—that paved the way to the subjugation of the unhappy Hindoos. In the last year of the sixteenth century the East India Company obtained a charter from the crown permitting, and, in fact, authorizing it to control the commerce of the Indian Ocean. By this charter power was given to license private traders, to punish infractions of the company's laws, and to govern the whole great region specified in the grant.

The company went to work as a trading corporation. There was a governor and a corps of clerks, but no military organization. It was not until after sixty years that the idea occurred to subdue India and add it to the British possessions. In order to carry out this plan, soldiers were necessary. A small

number of troops were loaned by the government and sent over from England. It was some time before the company made use of the sepoys or native soldiers. For almost 250 years there was an unbroken succession of petty quarrels, mutinies and massacres. The ambition of Clive and the avarice of Hastings are examples of the motives that for a century dictated the policy of the company's governors. The policy of the proprietors in London can be stated in one word—dividends. Of what concern was it to the gouty capitalist who heard the sovereigns jingle in his coffers, that ten thousand starving, half-clad natives had surrendered those sovereigns only with their lives? His longing for the plunder was not lessened. The governor general must furnish the funds. He singles out some rich prince and boldly demands a tribute. If this is not paid, the doomed rajah soon finds himself involved in difficulties. A war arises, and the craft and might of the Englishmen are triumphant. The unhappy ruler loses his treasure and his throne, and the British flag floats over one more conquered state.

As is always the case when unscrupulous men are given unrestrained authority over other men not as powerful as they, so these acts of oppression grew more and more flagrant, until at last the English were aroused, and this form of government was abolished.

At the present day everything is changed. The governor general is appointed by the Queen, and each residency has its own governor. The administration of the province is now well conducted. Under a humane system of government the Hindoos are becoming reconciled to British rule.

Thus has England in the latter part of the nineteenth century brought into subjection the vast and rich territory which had for two hundred and fifty years been a source of anxiety and expense. Long since did she bow her head in shame at those disgraceful proceedings, and then repentant, lifted it again to atone as far as possible for her former remissness.

C.

MEETING OF AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

The fifth annual meeting of the society was held in New York, November 5, 6 and 7. The society met in the hall of the New York Academy of Medicine, 12 West 31st Street. The

opening session took place on Wednesday, November 5, at 8 p. m., at which the president delivered an address, which was followed by a supper and social reunion. Thursday, at 10 a. m., the executive session opened, when the committees reported and general business was transacted, after which professional papers were read and discussed. The afternoon was taken up with further reading of papers, among which was one by Prof. R. H. Thurston, "On Sliding Friction of Rotation;" another by Wm. Kent, on "Factors of Evaporation for Use in Boiler Tests;" and another by F. W. Halsey, on "A New Rock Drill." Friday, the last day of the convention, was occupied in an excursion to Paterson, N. J., by special train furnished by the D., L. & W. R.R.

The chief points of interest visited were the Passaic Rolling Mills, the various locomotive works of Rogers, Grant, and Cooke, and the silk mills. Returning in the afternoon to New York, the society was invited, through the courtesy of the trustees and faculty, to visit our institute. The shop and laboratories were lighted with the usual electric lamps, and the visit made as enjoyable as possible. Stevens was well known to them all by reputation, but many of the society had never before looked through our well equipped college under such a favorable opportunity, and many were the laudatory comments made upon its efficient management.

Mr. Holloway, of Cleveland, O., was unanimously elected president for 1885-6. Among the members of eminence present were Messrs. C. W. Copeland, C. Sellers, Henry R. Towne, W. L. Church, Wm. Hewitt and Wm. H. Wiley.

In the year 2400, Joseph Cook says, the population of this country will be 3,200,000,000. Those of our readers who contemplate going to the circus that year will do well to purchase tickets at the down town office and avoid the rush at the wagon.—*Burlington Hawkeye*.

The Amherst *Student* says: "Last Monday night occurred the first rush of the season, and for the first time in the history of the college there could be no doubt as to the result. After a well contested rush the class of '49 bore away the cane." The joke lies in the fact that President Seelye forced his way into the struggling mass of student flesh and walked off with the cane.—*The Lafayette*.

TECHNICAL EDUCATION.

Technical education in the United States has improved appreciably in the last ten or fifteen years, not on account of any substantial aid from the government, but from the exertions of private citizens and corporations entirely. It is a subject which should receive more attention from Congress, for this country stands alone almost among the nations as the one which pays the least heed to this all important topic. If the same thoroughness and supervision were exercised in this country as in foreign countries for the education of young men in a line which would make them useful citizens, there would be less heard of the miseries of the people of our great cities. Mr. Edward T. Steel, of Philadelphia, has recently returned to this country after a careful inspection of the industrial schools in Europe. His visit was made for the purpose of studying the methods of instruction in foreign countries, with the view of adopting some of the ideas for the establishment of schools in the United States. He was very much impressed with the remarkable care manifested by the stronger governments for the education of the people, the earnestness evinced by the people in securing the benefits of instruction, and the thoroughness with which the work is done, and the excellent results obtained. In Germany the people are compelled to finish a course which in this country would prepare them for what we call a "higher education." These extracts from his report will be found quite interesting.

TECHNOLOGY IN ENGLAND.

"England in the last twelve years has devoted her energies very largely to the public school question. But within a recent period she has in addition given her attention to manual education, then artistic instruction, and more lately to technology. But in fact all through Germany, England, France, Belgium, Switzerland and Holland there has been great work done for industrial schools. The governments of these countries have regarded these schools as an essential thing. With them industrial education is no longer an experiment, a plan, a theory. It is an established practical reality. The result has been most beneficial. In England the tendency has been principally to instruct in the use of tools, or to teach mere manual acquirements. In Germany it has been both manual and technical. First, general instruction would be given, then it would be specialized."

The schools in Germany were first under the direction of individuals, but now nearly all are state institutions. The pupils pay but a nominal

fee for tuition, and are exempt from all fees if unable to pay them.

"The German towns have schools of technology, as well as the cities. Certain towns have certain industries peculiar to their own localities. The schools in those towns will make features of those industries in its curriculum. In the cities the course of study will be broad and comprehensive. Drawing is everywhere considered the basis of an industrial training. It is the very alphabet, they say, of a technical education. Among the largest institutions is that at Munich, founded privately in 1868, now a public school. There the instruction is chiefly in ceramics and designing textiles. Workmen go out from this school to large business houses, and the head positions in factories, and meet with wonderful success. At Nuremberg, Dresden, Berlin and Vienna there are well equipped state schools, giving training in the use of tools, the trades, and in the higher industrial arts. The boys and girls like their work, and those who were once in the schools, but are now out, are doing well."

The following account of the schools in Paris will attract particular interest, and goes to show too plainly how neglectful our government is in providing schools for the benefit of the people.

THE SCHOOLS OF PARIS.

"In Paris there have been established under the present republican government sixty primary schools in which manual instruction is given. These have made such a demand for higher technical education that the applicants cannot be accommodated. The government intends to meet this demand by building more schools. In the 'Ecole Rue Tournesfort,' which I visited, I saw boys between the years of six and ten learning the use of all kinds of tools and working most intelligently from their drawings. Boys ten and eleven years old were busy at drawing, modelling in clay, carving in wood, and at joiners' and smiths' work. Others, twelve years of age, were engaged in special branches, each boy pursuing that for which he had a special bent of genius. The school on the Boulevard de la Villette is a similar institution. In each one there are several hundred pupils. There are many other schools in Paris and other parts of France, and the instruction given comprises all branches."

England is not far behind Germany and France in her system of industrial education. Schools have been established in London, Manchester and all the principal factory towns, and the good results of this work are everywhere apparent.

"There can be no doubt but that the United States ought to learn from the experiments of the European governments. If we had a system of industrial schools here such as there is abroad, the result would be most surprisingly a benefit to us. It would be a fundamental protection to American industry and would mark a new epoch in our national progress."

NOTES from the PROFESSION.

The American Engineer, in a recent edition, criticises Mr. Edison's intention to supplant the steam engine by electricity. It seems that Mr. Edison hopes to devote five years to the perfection of his plans, the main point of which is, of course, to obtain the desired electricity directly from the combustion of coal, instead of employing as intervening mediums the heat of the coal and the steam engine. This problem, which is the desideratum of all electrical engineers, is hardly one which can be solved within so short a period as five years. The solution is rather the work of a lifetime, and when satisfactorily developed would prove the greatest discovery in the world's progress. In very few good steam plants does the steam engine give out available energy less than 10 per cent. of the total energy of the fuel. Those now employed for furnishing power for the Edison dynamos, give out as high as 15 per cent. of all the energy, thus showing that in the best steam engines we get out of coal about one-tenth of what we ought to get. Now, in order to lessen to any considerable degree this immense loss, some method besides that now employed must soon be discovered, and it has been conceded that the plan which Mr. Edison purposes to investigate is the best which has been proposed. Even should he be able to accomplish, in the stated time, anything which can be turned into practical use, will the machine so constructed develop a sufficient amount of energy over that now obtained from steam to insure its success in an economical point of view?

The Electrical Engineer in its review of the Electrical Exhibition at Philadelphia which closed October 11, among other interesting matter makes the important statement in regard to the comparative practicability of arc lighting and incandescent lighting, that "to an observer attempting to forecast the direction of the future development of electric lighting, the early decadence of the arc system of lighting is most clearly apparent." In regard to the subject of electric motors, which were given a prominent position at the exhibition, the *Review* further states: "It is much to be regretted that there was so little evidence to be found in the exhibition of any essential progress in a field which affords scope for a wider practical util-

ity than even that of electric illumination—the employment of electricity for transmission of energy. * * * power looms, power planers, printing presses and rotary pumps were driven by electric motors. Yet we did not observe any attempt to transmit more than five or six horse power at the most, which is hardly a step in advance of what was shown by Gramme at the Paris exhibition of 1878."

Among the large contracts recently finished and those in progress of construction are noted the following, which are interesting as departures from the ordinary work of the engineer. The tunnel under the Severn, begun in 1873, is about completed. The total length is seven and a half miles, four and a third miles of the tunnel being under the Severn. The great bridge over the Forth, which is still unfinished, will cost when completed £1,600,000. A bridge to connect Cronstadt and Tamenlaume, in Russia, is to be built. The bridge will be about five and a half miles long, its estimated cost being £2,400,000.

The only railroad in the United States which has been equipped throughout its entire length with automatic electro block signals is the Providence & Worcester. The work has been done by the Union Switch and Signal Co., of Pittsburgh, Pa., the characteristic feature of which is the maintenance of a continuous electric circuit through the rails of the track, from one end of each block section to the other. When a rail is displaced or the circuit broken in any way, the signal arm shows "danger," and, also, when a train is in the block the "danger" signal shows, caused by the train shunting the electric current from the electro-magnet.

The new Cunarder, "Umbria," launched last June, has made her first trip across the Atlantic, and made very satisfactory time considering it was her first voyage. The *Iron Age* gives the following interesting description of the new steamer. The trial trip of the "Umbria" took place on the Clyde, October 4, the vessel steaming thirty miles at a speed of twenty-one nautical miles an hour. She is the largest vessel afloat with the exception of the Great Eastern. Her dimensions are 520 ft. long, 57 ft. 3 in. breadth of beam, and 41 ft. depth of hold, and measures over 8,000 tons. The "Umbria" was built at Fairfield-on-Clyde, at Elders' yard, where most of the fast steamers have been built. The electric

light is used. The saloon measures 79 ft. in length, the steamer accommodating 720 first class passengers. The engines of this magnificent work of marine architecture are said to be the most powerful in the world. The centre high pressure cylinder is 71 inches diameter, and the two low pressure cylinders are each 105 in. diameter, with a 6 ft. stroke. The screw is made of manganese bronze. The quality of manganese bronze, combined with the development in practice of the true proportion of the screw propeller, are computed to add upward of a knot an hour to the performance of the old fashioned cast iron blades. The vessel is fitted for the Admiralty service, and can carry coal for 16 days when running continually at a speed of 18 knots per hour.

Speaking of the utility of storage batteries for practical purposes, Mr. Edison says that he has spared neither time nor money in the effort to perfect a battery that can be of practical use, but without success; and that the storage battery can never be used to any extent except for scientific purposes.

STUFFING BOX.

The forgings for the Eccentric and Bolt are under way.

Has anybody ever seen the Stevens Institute library—in operation?

W. S. Dix, '87, has been elected editor for THE INDICATOR, in place of Ladd Plumley, resigned.

And we still continue to be unarrested for "illegal voting" (just think) and "perjury." (What a merciful deliverance.)

"Professor"—this is a Junior speaking—"as I understand it, you say the body has no weight. Well, then, it seems to me you ought to take gravity into account."

The reception room is now a thing of the past, and we may expect to see the tables in the library well filled with Sophomores and Freshmen. These are the only *seats* left now for the students.

The prudent and conscientious man refrained all election week from *celebrating*, for fear that in his efforts to "toot" for the candidate of his choice he might be celebrating for the other fellow's.

'86! THE INDICATOR is just to all, and we have ascertained, not without some effort, that '85 paid for the watermelon they took from you, in preference to spending the night in a *latticed* room at the lower end of town.

The treasurer's office, being located in the Institute building, will probably insure the more prompt payment of bills. It generally took weeks to arrive at the proper humor to climb up to the H. L. and I. Co.'s office.

The men who voted Nov. 4 had no difficulty whatever. The "bluffing" programme of the Democrats was ably carried out by themselves, but it did not hinder some twenty or thirty of the students, Republicans and Democrats, from voting.

Some of the classes still exhibit that spirit of recklessness for the feelings of others, which was supposed to have been left behind in the Prep-ery. The Sophomores make enough noise in the halls of the Institute to cause even Preps. to blush with shame.

The foot ball suits this year are more serviceable than the fancy uniform bought last year; and, right here, we don't understand why the Athletic Association are so reckless with the clothes belonging to the teams. We see men playing foot ball in last year's base ball suits. Is this right?

Through the kindness of the Committee of Arrangements of Columbia College, who presented us with tickets, about forty of the students went to the Blaine meeting at the Academy, held under the auspices of the Columbia Republicans. The speakers were all prominent men, the meeting being a highly interesting one.

An individual writes to Prof. Morton to know if he cannot borrow "those lanterns" the students used for a Democratic parade? Well, now, the man is entirely too backward and retiring. Why not ask for the fellows, too; probably they are better looking than his own crowd. Political license, some say; we say political cheek.

The game at Princeton was not as satisfactory as our games away from home generally are. The score was 56 to 0 in favor of Princeton. The Princeton team played *hard* to win 22 of the 56 points, and, the referee, a Prince-

ton man, to be sure, for they were not going to run the risk of another small score going to Yale, supplied the remainder, and then looked dissatisfied to think he hadn't done better.

Translated from the German, as a specimen of the kind of jokes they like in the Fatherland :

Little Fritz : "O, pap, may I for me not from thy beard a pair of locks off cut?"

Father : "What wilt thou therewith my child?"

Little Fritz : "My rabbit mend from whom has the Emma the tail out snatched."

'88 deserve a great deal of praise for the interest that has been shown for foot ball in their class. At the practice games at the grounds there have been as many Freshmen as any other class playing against the team, and all doing well. Neither '86 nor '87 did as well in their Freshmen year, and if the lower class this year will only work on, the prospects for next year's college team will be brighter.

A young man, apparently a stranger, asks a Freshman, at work in the drawing room, if a certain professor is in the building. Freshman says, "he doesn't know, but can tell him where his office is," and just commences to tell him how many flights of stairs to descend, where to turn and where not to turn, besides expatiating upon the subject of the intricacies of the building in general, when he is interrupted with : "Oh, never mind all that ; I graduated here in '79."

Maury, '84, has left Prof. Thurston and intends going to Texas, where he expects to engage in copper mining. Gen. McClellan is largely interested in the project, and through him Maury has been able to secure a very good position. His outfit when he left Hoboken consisted chiefly of a Winchester repeater and a couple of seven *shooters* ; whether he expects to mine with these *instruments* or not we are unable to say, only we hope he will strike a rich vein, no matter whether with repeater or pick.

Those who growl about the results in foot ball are generally fellows who are not able to play, and are therefore not capable of judging fairly. It is a difficult thing to arrange a team and so manage your own duties at the Institute as not to fall behind in your work.

If the growlers would exercise their self conscious ability to run a foot ball team successfully in climbing up on a box and ventilating themselves as to their method of running an eleven, it undoubtedly would be more to the purpose. Help the teams ! Don't hinder them !

The Republican Club of the Institute turned out for the last time in the campaign in the large parade in New York, Oct. 31. Through the kindness of Mr. Edison the club held *fourth* position in the line. The arrangements were that the club should march with Mr. Edison's command ; but when they reached New York, it was only to find that the insurance men had crowded everything else out of Edison's lines. The storage batteries which the club proposed to carry could not be used, the necessary shaking of the cells in marching rendering the scheme impracticable. Although without any lights, the fellows did well enough to occasion considerable applause. The idea of carrying hammers was a good one, and made an attractive novelty. After passing Mr. Blaine, who gracefully acknowledged the head splitting yells fired at him, the club took up a position along Fifth Avenue and cheered one continuous cheer until after twelve o'clock. There were ninety men in line, making five companies, with the following officers : Major B. T. Hart, '87 ; aides, C. J. Field, '86 ; C. R. Collins, '86 ; Captains, E. Munkwitz, '85 ; W. A. Adriance, '85 ; W. R. King, '86 ; C. A. Healey, '86.

ATHLETICS.

WESLEYAN vs. STEVENS—OCT. 25, AT MIDDLETOWN, CONN.

Besides the disadvantage of playing on strange grounds—grounds so peculiar that a thorough acquaintance with them was almost a necessity—our team was weakened by the absence of Campbell: Cotiart, Brownell, Hart, Dilworth, McCoy, Burhorn and Greenebaum playing in the rush line ; Munkwitz, quarter back ; Baldwin and Kletzschn, half backs, and Adriance, full back. Wesleyan's players were: Rushers, Thompson, Hamlin, Blaine, Sutherland, Pike, Hawkins and Wilcox ; Q. B., Upham ; H. B., Saxe and Judd ; F. B., Scott.

The toss was won by Wesleyan, and Stevens opened the game at 3.15. Superior kicking and good work by the rushers carried the play past Stevens' 25 yard line, where the ground was hotly contested for several minutes. Good runs by Baldwin and Kletzschnig took the ball again to the centre of the field, and shortly afterward Saxe, by a long punt, sent it nearly to Stevens' goal line, where Kletzschnig caught it, but was tackled and lost the ball. Wesleyan improved the opportunity and made a touch down, but did not succeed in kicking a goal. On being kicked from the 25 yard line, the ball was stopped, and in the next scrimmage Stevens was forced to touch down for safety. During the remainder of the half, Wesleyan was put on the defensive, Baldwin and Kletzschnig carrying the ball twice nearly to their goal line, where trials for goal were unsuccessfully made.

In the second half the play was quite close, most of the time the ball being near the centre of the field. Once, when the play was a little in Wesleyan's favor, some good passing and a quick, long kick increased her score by a goal from the field, making it 11 points to Stevens' 0.

Wesleyan played a much harder game than Stevens and was also superior in weight. A noticeable feature of the game was the punting of Saxe.

Umpire for Wesleyan, Mr. Beattys; for Stevens, Mr. Schultz. Referee, Mr. Cutler, of Yale.

PRINCETON *vs.* STEVENS—NOVEMBER 1, AT PRINCETON.

Princeton—Rushers: De Camp, Wannamaker, Harris, Adams, Bird, Irvine and H. Hodge; Q. B., R. Hodge; H. B., Lamar and Baker; F. B., Toler.

Stevens—Rushers: Cotliart, Kletzschnig, Glasgow, Dilworth, Hart, Burhorn and Greenebaum; Q. B., Munkwitz; H. B., Baldwin and Campbell; F. B., Adriance. Umpire for Princeton, Mr. Conners; for Stevens, Mr. Rice. Referee, Mr. Moffatt, of Princeton.

Stevens' players became so discouraged shortly after the beginning of the game by the decisions of the referee, that they moved about as fast as they had to and no faster. Both Baker and Lamar made several good runs, Princeton scoring four goals and one touch down in each half, making a total of 56 points to Stevens' 0.

The men who can impartially referee a game of foot ball between their own and some other

college are very few, and this case was not an exception, as the referee ably seconded Princeton's umpire. He had a way of using his cane with considerable vigor, tapping Stevens' rushers on the back as a means of impressing upon their minds some decision, warning or remark. When, after showing more than ordinary patience, one of Stevens' rushers remonstrated, he was told, "Shut your mouth; I am managing this game."

On another occasion, the referee must have thought he was playing on the Princeton team as of old, for he went into the rush line and pushed a Stevens man "on side."

As referee, Mr. Moffatt is undoubtedly of more value to Princeton's team than he ever was as a player.

RUTGERS *vs.* STEVENS—NOV. 4, 1884, AT NEWARK.

When time was called a light rain was falling, and after fifteen minutes' play the ground, the ball and the players were so wet that the referee stopped the play, and decided the game as drawn.

Both sides, however, had succeeded in scoring. A run of more than half the length of the grounds and a good kick yielded Stevens a goal from the field, and one of about 25 yards by Patterson gave Rutgers a touch down, from which, however, the trial for goal failed.

ADELPHI ACADEMY *vs.* STEVENS—NOV. 6, 1884, AT HOBOKEN.

The visitors, although playing with considerable pluck, were rather light, and were outplayed in two twenty minute innings, 58 to 0.

UNIVERSITY OF PENNSYLVANIA *vs.* STEVENS—NOV. 8, 1884, AT PHILADELPHIA.

Pennsylvania's players were:

Rushers: Smith, Beck, Mitchell, Tunis, Houston, Thompson and Bell.

Quarter Back: Lindsey.

Half Backs: Moffley and Thayer.

Full Back: Noble.

Stevens—Rushers: Greenebaum, Burhorn, McCoy, Dilworth, Hart, Glasgow and Cotliart.

Quarter Back: Munkwitz.

Half Backs: Baldwin and Campbell.

Full Back: Adriance.

Umpire for Stevens: Mr. A. P. Kletzschnig.

Referee: Mr. Remak, of University of Pennsylvania.

The Pennsylvania rushers did very good work, getting down on the ball very well when it was kicked by their half backs. Stevens' play from beginning to end was weak and very loose, errors of all kinds being numerous. Pennsylvania kicked the ball off, and their rushers prevented Baldwin from returning it. A wild throw took the ball back of Stevens goal line, where Adriance was forced to touch down for safety. Pennsylvania made four touch downs during the first half, from only one of which was a goal kicked. In the second half a goal and a touch down were added to her score, leaving it 2 goals and 4 touch downs to 1 safety for Stevens; or, in points, University of Pennsylvania, 30; Stevens, 0.

On the 10th inst., the Class of '87 defeated '86, with a score of '87, 20; '86, 0.

Stevens, '88, played C. C., N. Y., '88, on the Central Park grounds, New York, on November 11, and won. Stevens, '88, 8, to C. C., N. Y., '88, 0.

PERSONALS.

'76.

ADAM RIESENBERGER has been appointed Treasurer of Stevens Institute, his office being the room opposite the President's, in the Institute building.

ALFRED R. WOLFF is associate editor of the *American Engineer*, published at Chicago, Ill.

'82.

HOSEA WEBSTER, with the Worthington Pump Co., is now in charge of the Chicago offices of that company.

'83.

E. DUQUE ESTRADA, having returned from Cuba, is at present with Prof. Thurston.

MALCOM McNAUGHTON is at his home in Mumford, N. Y.

F. K. IRWIN is with the Wisconsin Central R.R., experimenting with improved air brakes.

'84.

HARVEY MITCHELL is instructor of shop work in the College of the City of New York.

G. M. SINCLAIR is with the Midvale Steel Works, West Philadelphia, Pa., deducing laws for the different tools by which the maximum amount of work can be obtained in the least time.

C. L. GATELY is general superintendent of the Patent Cane Umbrella Works, at New London, Conn.

EDWARD B. RENWICK is at the Brooks Locomotive Works, Dunkirk, N. Y.

CHARLES W. THOMAS has a position as assistant superintendent of the Dixon Lead Pencil Works, Jersey City.

FRANK VAN VLECK is pursuing his studies at Johns Hopkins University.

D. H. MAURY is at Gen. McClellan's copper mine in Northwestern Texas.

WILLIAM L. LYALL is ill, and has withdrawn from Hanover University for a time.

L. D. CARROLL is with the New Orleans Exposition, where he will remain until it closes.

EXCHANGES.

As our first number of this year went to press very few of our college exchanges had arrived, probably owing to the difference in time at which the various colleges open. However, they have all come to hand now, as well as our valuable professional exchanges, and we shall endeavor to give a synopsis each month of the most important subjects discussed in the current journals of the day. The exchange department of THE INDICATOR has had a most phenomenal growth. The present editor, looking back over the files, finds that as late as last May we counted about ten college journals, and to-day such papers as *The American Engineer*, *Van Nostrand's Engineering Magazine*, *The Electrician* and *Electrical Engineer*, *American Machinist*, and many others grace the files in our office, together with a vast stock of college monthlies and bimonthlies. It will be the aim of this column to direct the attention of its readers to such articles on engineering and electricity which appear in these magazines as will be of the most interesting and important character.

In *The American Engineer*, for several weeks past, has appeared a continued address, read before the British Association at Montreal, on the "Forth Bridge," by B. Baker. The site of this bridge is between South Queensferry and North Queensferry, on opposite sides of the Firth of Forth, twelve miles above Edinburgh, and will be the largest girder bridge yet built, when completed. The Firth at this point is about a mile wide, the intermediate points of support for the bridge being granite piers and a natural rock island that exists at about midway between the shores. The piers are about completed now, and the steel portions of the structure have been in process of construction for some time past, at the works near by, so the completion of the enterprise will be rapid. The bridge is of the cantilever type, the two longest spans of which will be 1,700 feet each, being 100 feet greater than the distance between the piers of the Brooklyn Bridge. The completion of a steel girder bridge of this magnitude will be looked forward to as a grand triumph in engineering. The address by Mr. B. Baker is well worth looking up and reading. The number for Oct. 24 gives a sketch of the life of Mr. Chas. Brush, the electrician, as "The Lesson of the Time." It shows the triumph of a well-trained scientific man, highly skilled in shop practice.

The number for Oct. 31 contains a rather gloomy account of the outlook for the Panama Canal, including some discouraging testimony by Commodore Schufeldt, U. S. N., who has lately returned from the isthmus. He estimates that \$400,000,000 will be necessary to complete it, and he thinks it will be impossible to raise sufficient funds. Capt. Pim, R. N., who has also just returned to New York from Panama, states the death rate there from yellow fever at 109 per 1,000. 4,000 of the company's men have already died, and enormous hospitals accommodate the patients.

In *Van Nostrand's Magazine* for November we find the essence of Messrs. Gantt and Mauzy's thesis written last year on "The Efficiency of Fluids in Vapor Engines." The fluids considered are water, alcohol, ether, carbon disulphide and chloroform. The subject is divided into five cases, each case having a different set of conditions under which the action of the fluids are considered. The final conclusion reached is that "All the apparent advantages of the non-aqueous vapors may be gained in the steam engine by an increase of initial pressure, and as the tendency of mod-

ern practice is in that direction, it seems certain that *none of the non-aqueous vapors will ever successfully compete with steam.*" They show a gain of 3 per cent. efficiency in the case of chloroform, using a cylinder three-fourths the volume of that of steam, but its high cost excludes it as a competitor.

The Electrician and Electrical Engineer contains articles of interest to that profession, among which are "The Brooks Underground Telegraph System," "Electric Lighthouse Experiments in England," and "Progress of Electric Railroad Signalling in the United States."

We are pleased to acknowledge the receipt of a new exchange, *The Haverfordian*. It is a neat, twenty-four page paper, and one of the brightest college journals we have seen. After the usual editorials pertaining to affairs of the college, and which show that the editors are decidedly literary in their tastes, several pages are taken up with an interesting article entitled "On and Off the Lancaster Turnpike." The article is well written, and the board of editors should be proud of having one of their number show such pleasing descriptive talent. We understand the author of it is preparing for a literary profession, and we venture to predict for him a brilliant success. The local column is sparkling and witty. A notable feature is the illustrations, which would do justice to the highest class of magazines. Haverford, we congratulate you upon having such a worthy journal.

Just before going to press we received *The American Engineer* for November 7. We would call the attention of all to a most substantial article by Prof. J. E. Denton on the fundamental questions as to energy of steam. This is a subject that all should familiarize themselves with, and the main points in this article are put in the professor's terse and comprehensive style.

THE COLLEGE WORLD.

YALE.—Theodore Thomas has invited the Yale and Amherst glee clubs to give a series of joint concerts in the large cities of the West.—Those who love order and discipline are in agony over the attempt which the political clubs made at military tactics.—The

Senior debating society has decided that private morals have no place in the political canvass.—The yearly examinations have given place to semi-yearly ones.

PRINCETON.—The foot ball team is not so strong as we were led to believe at the beginning of the season.—Gymnastics are compulsory in the Freshman and Sophomore classes.

RUTGERS.—Every week a part of one of the Senior's recitations with Prof. Gates is devoted to general discussion. The class is divided into three committees, with a chairman at the head of each. It is the duty of the members of one section to ascertain the principal facts of interest in current literature; a second furnish reports of the most important scientific discoveries, while the third post themselves in regard to the important events transpiring in the political world.—*Targum*.—Prof. Hasbrouck has left the college and gone to the Adelphi Academy, Brooklyn.

AMHERST.—Arrangements have been made by the college authorities by which the weather reports of the Washington Signal Bureau will be sent to Amherst each day.

IN GENERAL.—The recent boat race between the Freshmen and Sophomores of Columbia resulted in a victory for the Sophs.—Of two hundred and sixty students at Johns Hopkins University, one hundred and fifty are college graduates pursuing post graduate courses.—Caise, of Williams, has broken the ball throwing record by a throw of 373 feet.—The University of Virginia is to have a new chapel, costing \$20,000.—The laboratories of the Massachusetts Institute of Technology have been greatly enlarged during the past summer.—The Adelphi Academy has now a professor of gymnastics.—On account of the serious results attending the late cane rush at Cornell, the officers of the classes have been summoned before the Faculty.—Two of the editors at Dartmouth have been suspended for a too free expression of their views.—A new department, of engineering, has been established at Michigan University.

An Irish soldier went to his station with the order to report anything remarkable that should happen during the night. A drunken fellow fell off the wall and broke his neck, and no report was made. When questioned about

it, Pat replied: "Faith, and I obeyed orders. If the man had fallen off the wall and not broken his neck, I should certainly have reported it."—*Ex*.

CHIPPINGS.

I SAW.

I saw—
A gentle maiden, aye, so lovely, too;
A sturdy youth near by, alack, too true.

I saw—
Him there, but where on earth's his arm, I wonder?
Where? Round my girl's waist it is, by thunder!
—*Spectator*.

Dr. Keems says: "Kissing is a purely American habit." Let us remember this, dear brethren, and ever liberally patronize home industry.—*Sibyl*.

Smart Youth—"Jim, do you know why white sheep eat more than black sheep?"

Scientific Companion—"No; do they?"

S. Y.—"Yes; it's a fact."

S. C.—"Well, perhaps the chemical constituents of white wool require—"

S. Y.—"Oh, nonsense! they eat more because there are more of 'em."—*Tech*.

A lecture was delivered at Cornell last year on "New Jersey; or, the Mysteries of an Unknown Land." The lecturer being a graduate of that institution.—*Sibyl*.

It is an old story, but perhaps will bear repetition for the present generation: A mother sent her promising boy out to saw up some old logs that had once been used on the railroad. After some time the mother, upon going out, found her boy sitting in a rather dejected mood, and she said: "Why, what's the matter, my son?" The boy replied: "Mother, I find it hard, so hard to sever old ties."—*Northwestern*.

Thomas Hood, driving in the country one day, observed a notice beside the fence: "Beware the dog." There not being any signs of a dog, Hood wrote on the board: "Ware be the dog?"

I want to be a coachman, and with the coachmen stand,
Brass buttons on my livery and whipstock in my hand;
To sit upon a carriage box—this is my brightest hope—
And with the pretty daughter plan the best
elope.

—*Re*

* THE * Stevens Indicator

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HOBOKEN, N. J. :

* Stevens Institute of Technology. *

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THE STEVENS INDICATOR.

THE
Stevens Institute of Technology,
SCHOOL OF MECHANICAL ENGINEERING,
FOUNDED BY THE LATE EDWIN A. STEVENS,
—AT—
HOBOKEN, N. J.

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STEVENS HIGH SCHOOL.

THE ACADEMIC DEPARTMENT

—OF THE—

STEVENS INSTITUTE OF TECHNOLOGY,

RIVER STREET, bet. 5th and 6th, HOBOKEN, N. J.,

OPENS SEPTEMBER 17, 1884.

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THE Stevens Indicator.

Vol. I.

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No. 9.

The Stevens Indicator.

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BY THE STUDENTS OF
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Editors.

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AS 1884 draws to a close and the Christmas holidays loom up before us, it is but natural to look back and consider for a few moments, and then plunge into our race with Time again, and continue with the same good resolutions that we made at the same time last year. Though, for some reason, we have not remembered, or at least have not kept them this year, so nearly finished, yet we think that we have cause to believe that we shall be more successful in our endeavors the

me; but who knows?

✓ are we going to spend this vacation?

if us, going home, will get solid enjoy-

ment out of those great sports furnished by nature, skating and sleighing. For some, this pleasure will be enhanced by the presence of that some one from whom frequent daintily addressed letters are seen in our letter rack. Others, more "practical" or, rather, less appreciative, will find plenty of enjoyment alone or with chance companions. However, each one, according to his tastes, and, in whatever way he may spend the time, will feel that we have deserved all this luxurious feeling of rest which we can enjoy to our satisfaction for two weeks at least; first, because we have finished a hard term's work and have passed creditably through all our examinations, without any dread "conditions" dragging at our heels; second, by being another year with our professors we have only increased the good opinion which they had of us from the first.

Thus, THE INDICATOR, rejoicing in the same good fortune, presents its compliments to its subscribers, with a MERRY CHRISTMAS TO ALL!

WITH this number of THE INDICATOR closes the first year of its struggle for existence.

The struggle has been more successful than was anticipated, and at the end of the year THE INDICATOR is not only out of debt but has a small balance remaining. Financially, the paper has succeeded; but as to its filling the ideas of every one as to what a college paper should be, we cannot say; only this, that if the students would but make themselves personally interested, as they ought to be, in the college journal, there would be less reason for doubt. The year has been full of experiences chief among them the fact that the students

will not contribute as they ought in order to make the paper *an established* success.

THE INDICATOR knows no politics; it is (as the Constitution reads) "published by the students," and welcomes all contributions which will be of interest to the college and its friends. We hope to continue our friendly intercourse with other colleges, and shall soon be able to report a full list of exchanges. Vassar we still have to negotiate for, and we hope our efforts will not be unavailing.

Having passed the first year with fair success, we shall consider our paper as one of the fixtures of the Institute, and will be more criticising whenever occasion demands. There are many subjects that THE INDICATOR has still to discuss, and we hope with effect; so, before opening fire, we would suggest that the just shall continue to merit the fair name of the just, and that the unjust will mend his paths and make them straight, for if THE INDICATOR sees a weak point, and the subject needs a talking over for the good of the Institute, we will open the conversation.

The year's run is finished, and the *card* recently taken shows both good points and weak ones. During the holidays THE INDICATOR will be taken apart and thoroughly cleaned and burnished. The chief defect in the readings indicates that a change of fuel is necessary, and as we reckon fuel by dollars and cents, we earnestly recommend that each one subscribes one dollar and a half's worth of fuel for the coming year.

IN answer to an appeal from the "Twilight Club," made through Prof. Kroeh, the patriotism of the students was stirred up, and they responded with a subscription of one hundred dollars toward the pedestal fund for the Bartholdi Statue of Liberty. Through the efforts of Prof. Kroeh, a stone has been secured in the pedestal, on which is to be an inscription of the Stevens Institute of Technology. This stone, in addition, is to be on that side of the pedestal facing the Institute,

and, though Stevens will always remain celebrated on her own merits, the stone will stand in the greatest statue in the world as a fitting place for a memorial of the first technical school in the country.

THE Inter-Collegiate Foot Ball Association can make rules regarding the individual player's conduct; but the rules will fail in some cases, and then the question of honor comes in.

We speak of the unwarranted backing out of an engagement of one team, after a game had been definitely arranged.

We have noticed that we are not the only ones who have suffered from this evil, but have heard complaints from other colleges, and strange to say, all are against the same team. Rutgers has long been establishing the reputation of "play when we have a strong team, but don't make engagements, or else back out when we have reason to think we will be beaten."

Teams outside of the Association have no redress, and all we have to rely on, and all, previous to this season, that was necessary, was the honor of the individual teams.

We negotiated with Rutgers for two games early in the season, but no dates could be settled upon, until appearances seemed to point to the fact of Stevens team being weak, then Rutgers asked for a game and fixed Nov. 22, at Hoboken, as the date. Believing the game would be a close one and interesting, the Athletic Association advertised extensively and made all the necessary arrangements.

In the meantime, our team met the Graduates and defeated them. This was Tuesday. Well, we felt encouraged, and had no doubt whatever but that we would win with Rutgers, and as the game was to be played the following Saturday, we felt sure of no disappointment.

Thursday before the game Rutgers refused to play, and we immediately supposed the *Times'* account of our game with the Graduates had influenced them, and a committee was

sent to New Brunswick. But even this reasonable excuse they did not make for backing out, but the all important one that "two of the team expected to preach on Sunday," and could not risk being stiffened up.

They absolutely refused to play, and left us but one day to make other arrangements for filling a Saturday that had been kept open for them for a week. We could do nothing on such short notice, and consequently lost one of our Saturdays.

This we mildly call dishonorable; and if politeness would permit, we have a smaller word that will fit more exactly.

To try and arrange a game of foot ball with Rutgers is a waste of time, paper, ink and postage stamps.

COMMUNICATIONS.

To the Editors of The Indicator:

I was delighted to see the subject of our long wished for and much needed gymnasium brought up again in your columns.

I, for one, believe in repetition in order to gain the ear of every one; indeed, it seems to me that it would be a good plan to put in large letters on the bulletin board, GYMNASIUM, and leave it there for the rest of the year. It was a happy thought to bring into conjunction with the first all important matter, the Library, not to supply the old one, for we never had one, but because it is an essential part of a high educational institute like ours. Having been one of a committee who have been obliged to meet where they could, in a room in the basement, for instance, since the loss of our reception room, I heartily indorse such a room in the extension you propose. May we soon have it in our possession!

STUDENT.

To the Editors of The Indicator:

I thought your suggestion of inserting Political Economy as a study a very good one. I hardly liked, however, the idea of doing away with part of our time for Literature, considering the subject, with a good text book, very valuable. Now, I think the following would be a good plan:

The Freshman class, at present, have their course in Belles-Lettres arranged as follows: First term, Fowler's English Language; second term, Deductive Logic; third term, Inductive Logic. My suggestion is that Logic be taken in one term, and Political Economy take its place the third term. I think that all those who have passed through our course in Logic will agree with me that it is too extended for our purposes, and that it is not so beneficial as to merit so much of our time; a term's study of the subject would suffice. A better plan, perhaps, would be to take up English Literature the Freshman year, and the other three the next. The latter do not necessarily come before the former; the more one considers this, the more apparent it becomes.

Another word in favor of Political Economy: In the *Eccentric* for 1878 the following appears: In speaking of the "History of Civilization," which they then studied, they say, "Now, with all due deference to the judgment of our learned Professor, we would suggest that the substitution of 'Political Economy' would be followed by good results. The former subject is important, we admit, and the knowledge of it we here obtain is valuable; but how much more consistent it would be to have here, in Stevens Institute, the study of the laws of exchange, of trade, of commerce, and of values! Is it not more in the direct line of our subject, and would it not be more important? * * * Let us have Political Economy; the spirit of our course demands it."

Let this last sentence be re-echoed in 1884!
P.

EDUCATIONAL REFORMS AND COLLEGE STUDIES.

[Alpha Beta Phi *Star and Crescent* for May—Abridged.]
(Concluded.)

It would be difficult, I apprehend, even for a professor of Greek, to point out special advantages in mental gymnastics derivable from the study of Greek, that may not be also derived from an equally scientific study of German; and if it be a question of the relative wealth of the two literatures, or of their utility in the activities of life, comparison becomes contrast. There are, however, but few reformers in education who would discourage the study of Latin.

There are matters of vastly more importance than mastering text books. The formation of habits of independent and original research, and the culture of manly character, are the highest achievements of college training; and the best work of the professor is not in listening to recitations, however well committed, but in quickening the curiosity of the students and guiding their investigations.

Instruction by investigation should be the key note of university life, the key note in all institutions where the students average above eighteen or twenty years of age.

What most persons would regard as an unwise extension of this liberty, has recently been introduced at Harvard. The students are not required to be present at recitations or lectures. Attendance is voluntary, and the examinations are the only test as to whether the student has done his work. But even this doubtful liberty has its advantages, and the trend of reform seems likely to lead to it in the highest institutions. How much time is wasted in the humdrum of the recitation room, where the student who knows his lesson laboriously pares his nails while he listens to the blunderings or extemporizings of dull or careless men! Besides, would it not be an excellent spur to the teacher? If students are to attend his exercises he must make it worth while that they do so, and indispensable to their passing the examinations.

Reformers in education have generally condemned the traditional method of language teaching by grammar and lexicon. They claim that it is unnatural, laborious, an immense waste of time, and that for the average student it does not lead to sight reading.

The study of every language should be carried to the point where it throws open the literature; anything short of this should be regarded as failure, and all work and methods of work should be adopted with reference to this specific result.

But by the methods of language study now employed in our schools and colleges, there is not enough of any language read to make sight reading an accomplishment; and this, not alone because the time given to it is too limited, but because too much time has been spent on grammar rules and details of trivial importance—on philology and the history of words. Our colleges attempt to make philologists and grammarians before they have made linguists.

The natural order is the quickest order. It begins with words, phrases. It first masters vocabulary. It associates names with objects

and meanings, as the child does in learning his own language. The grammar method reverses this, and begins with rules and principles, the application of which the student can not understand, and many of which never be used.

In other departments of study the method is from the concrete to the abstract—from particular to the general; but here the method of the language is taught before the language itself. No one wishing to learn French begins by committing to memory a volume of rules and formulae.

The aim of every teacher of languages should be sight reading, for that is the point at which the language becomes of real service; and it will be admitted that comparatively few of our college graduates attain to it, either in ancient or modern languages.

Emerson said that he did not know of any persons who could read Greek at forty; and it would be interesting to inquire whether there is one person in this assembly who, among personal acquaintances, knows ten clerical persons who can read the Greek Testaments as well as an average child of eight can read his Bible Testament. And when we recall the number of years and laborious teaching spent in learning classics, it suggests some vital blunder in the methods employed.

The advantages of a system of marks and prizes are so great, that few, even of the highest institutions, are without them. Where examinations are based on examinations, the attendance is few; but it has been questioned whether a system of marks based on daily recitations from a text book, under conditions of reward, tends to promote broad and useful scholarship or to exalt character.

On the contrary, it is said that such a system discourages independence of mind and dampens that grand curiosity which leads a student to wide and original reading. The text book and lecture would be made at least by the hopeful few who press for the mark of the prize, but at the expense of those habits which are indispensable to success. The prize man under such a system is not necessarily the truest scholar. It is certainly significant that Sir William Thomson, Clifford and Clerk Maxwell all failed to win the honor of Senior Wrangler at Cambridge.

Nothing is more important in a university than to keep up the dignity of learning by nothing more indispensable than an unusual tone; but these can hardly dwell in an atmosphere where there is competition over

minor details as verbal accuracy in text book recitations, and where the generousities of youth are exposed to ignoble motives. Surely for motive we might trust to the stimulating power of good instruction, to the spur which is found in the love of learning, and the *esprit du corps* of a genuine university.

Whether these suggested changes are true reforms, which will win their way till a renovated curriculum is established everywhere, or whether, after the experiments of a few generations, men will say that the "old is better," are questions for the future; but one thing is certain, the cause of education will prosper more and more, and the race of men will rise higher and higher.

"Yet I doubt not through the ages one increasing purpose runs,
And the thoughts of men are widened with the process of the suns."

The majestic generalizations in theroretical science which have characterized our time; the discoveries and applications in electricity which have created the illusion that we are living in an enchanted world; the rigorous historical criticism which is laying bare the quivering life of all ancient institutions; the unmatched material prosperity of the age; yea, the very challenge which philosophy and scholarship are giving to supernatural faith, all combine to make ours one of the critical epochs of the world's life—the morning of a day of marvels in progress and of benedictions for mankind.

"This fine old world of ours is but a child yet in the go-cart;
Give it time to learn its limbs: There is a Hand that guides."

FOREST OF DEAN.

Have any of you heard of Forest of Dean? I think not, so it is my intention to describe a visit there last summer. To begin with, Forest of Dean is a little out-of-the-way place in Orange County, N. Y., about five miles back from the Hudson. Its principal occupations are farming and mining. With this information, you are prepared to proceed.

Half of the summer had gone by, and I found myself at Montrose, a small place just below Peekskill, N. Y., my geological outfit as yet untouched. So one morning it came about that I amused myself by sitting on the string piece of the steamboat dock at Verplanck, waiting for the fog to lift. In a short time the

"Emeline" came along and I embarked, "overcoat rolled and slung U. S. army style, one day's rations in haversack." The little steamboat slowly made her way northward, until Ft. Montgomery was reached. Here, after crawling over the piles of iron ore which covered the dock, Mr. Macy, weigh master of the Forest of Dean iron mine, received me. He led me to his little office beside the West Shore Railroad track, and gave me all required information regarding my trip. Half an hour later I found myself in an ore wagon (without springs) ascending a very steep incline. The driver, a tall, lank fellow in hickory shirt, corduroy trousers and No. 17 boots, immediately opened fire.

"Be you a city dude?" he asked, at the same time eyeing me doubtfully. I informed him that my place of residence was the city, but that I did not correspond to the last idea.

"'This is fine weather we air hevin'. I s'pose ye air a—a—one of them fellers what goes around pickin' up rocks?" (This interrogatively.) "Well, yes; I admit I am a geologist in embryo." At this statement he gazed at me in a dreamy, bewildered way, and I was bounced about so by the running of the wheels over chunks of ore, that I had no desire to continue the conversation. He recovered sufficiently, however, to fire one more remark at me before I bade him good bye.

"That there's Bear Mountain; ye hed oughter see it when the leaves is turnin'." After a two mile ride we reached the "dump," where a train of six cars was discharging its load into chutes, which ran down to a platform, whence the ore was loaded on the wagons. Seating myself upon the *cleanest looking* car, a few moments only elapsed before the entire train, drawn by five mules, harnessed tandem, was rapidly ascending the grade. Here I was destined to be surprised and pleased, for the road wound through a broad, fertile valley beside a rushing brook. Meadow land was abundant, and near at hand the forests rose step after step up the mountain's side.

During this ride I had occasion to question the train men in regard to the time table at the mine. Their answers, involving the use of the words "day time" and "railroad time," bothered me considerably. Without giving their explanation of the terms, I will state the facts: For some reason (which I could not find out) the clocks at the mines are an hour faster than at the railroad stations on the other side of the mountains. That is, the miners go to work at 6 o'clock, but, as they

reckon time, 7 o'clock. Thus their hours are 7-12 and 1-5 "day time," or 6-11 and 12-4 "railroad time." Even after the explanation it was necessary for me to stop and think the matter all over before making a calculation.

When the cars stopped at the mine, I made my way to the "head house," and was waiting for the next car to take me seventeen hundred feet into the mine, when two four seated wagons drove up and dumped a load of city boarders by my side. In five minutes they had undergone a great change. Every girl was enveloped in a huge waterproof, with cape and hood, and each boy had produced an old coat and dilapidated hat. Their intention was obvious, so I concluded not to risk my life with that gang. Finally one of the foremen shovelled, metaphorically speaking, them into a car, and they descended into Plutonian darkness. I went out and began prospecting in the immediate vicinity.

After the dinner, which the men ate at 11 a. m., the blacksmith approached, and offered me a piece of tin, "just as it comes from the furnace." Talking with him, I found he had been a miner in southern England before coming to America, and that he had obtained a better education than most of his class. He was not busy just then, so we wandered off into the "wheel house." The motive power for the machinery comes from a pond a couple of miles back in the mountains, and runs the large wheels, one for pumping and hoisting and the other for ventilating. Although it was noon of a hot August day, I shivered in the wheel house, and gladly came out when my inspection of the machinery was completed.

Stopping to look in at the door of a little house, about 30 x 25, I heard a cheery "Good day; won't you come in?" The speaker, a man of fifty or so, rose and wiped off an empty powder box for me to sit on. I thanked him, and began to take in the surroundings. On the farther side of the room were piled boxes labelled, "Atlas Powder; explosive; handle carefully," while on the other side was a carefully guarded stove. Mr. Anderson—he told me his name in the course of our conversation—was at work preparing fuses for the next day's blast.

"Did you see that crowd from Stockbridge's?" he asked. "They'll get hurt down in the mine, tripped by the cable or something of the sort. If the boss was here they couldn't go down all at once." He reached for the coil of fuse and cut off a dozen or twenty pieces, each a yard long, then he opened a box

containing triple blasting cartridges, and slipped one on one end of each fuse, where he nipped it fast.

"Why don't you hammer them on?" I asked. He looked at me for a moment to see if I were in earnest and then, in response to an inquiry, he explained the method of blasting.

"We drill the holes and then put in an ordinary charge of giant powder. Then we take a prepared fuse and force it home upon the powder, and the thing is ready to be exploded." Scraping aside some sawdust, he took from an open box of Atlas powder a cylindrical shaped package, an inch or more wide and several inches long. "This is called 'Atlas powder,' but it is a powder only in name. You see it looks like a grease; a glycerine absorbent, I think you scientific men would call it. I make a hole in it by means of this punch, and force a fuse in, so. Now this package fits the drilled hole closely and serves as a wad. We can set off thirty or forty blasts in a single morning. No blasting is done in the afternoon."

The talk went on until it was time to return home. Making my way to the ore cars, I thoughtlessly seated myself on the forward car. The train was running slowly, and time after time, when my eye espied some desirable specimen, I jumped off and got it. When the mules had lazily dragged their load over two thirds of the distance, the boy on the leading mule dismounted and detached the whole string of mules. At first I did not realize what was to occur, but, as the cars began to move, I sang out:

"Hold up till I can get on the tail end of this concern. If you are going to coast down this grade I don't want any prominent position." I took up my station on the rear car, and the train of six cars, each having a load of two and a half tons, started down the grade. The cars were old and rotten, the track narrow gauge, the rails crushed and broken, and the road bed uneven. When the thing had got a good move on it I was pleased, but soon I unslung my bag and strapped the hammer on it. Then, as the speed was rather too considerable, I lay down upon the bag of minerals, dug my toes into the crevices in the corners of the car and grasped the cross beam with both hands. Then the cars fairly ricocheted along the track.

"Do - you - ever - run - off - the - track - eh?" I grunted out after enduring the torture for five minutes. "Oh, yes; we run off two or three times a week." By practice the man could talk

quite well under this process. "Did-you-run-off-yesterday?" "No." "Nor Tuesday?" A shake of the head. "Nor Monday?" Another shake. "Gosh gerockkity!" thought I, "I'm in for it, sure!" The expected catastrophe did not take place, and we came up the home stretch in fine style. It was my great pleasure (?) to have the opportunity of walking down to the river, as there was no wagon in sight. Talking with Mr. Macy until the "Emeline" came along, I found him a very interesting talker. His extensive reading on the subject of mining did him good service in the absence of more exact scientific knowledge. He is always glad to see visitors, and gives them all the information in his power.

The trip was a very enjoyable one, and my attempts at conversation were met with great politeness and a desire to assist me from all hands. I think that for those who have no friends engaged in mining and who wish to be shown the workings of a mine, the Forest of Dean mine is the spot to visit. C.

SOME FACTS ABOUT THE "HOWLING MOB."

Those of our friends in and out of college life who have read the account of the game between the graduate team and the Stevens, published in the *Times*, must have noticed the great difference between the first and last part of the article.

It is quite plain that the two parts were not written by the same person, and it is also quite evident to those who witnessed the game and had the honor of composing the "howling mob" spoken of in the *Times*, that the first half of the account was undoubtedly sent to the *Times* by one of the opposing team, and evidently by one who "wound himself up in a fight." The latter part of the article gives a sportsman like account of the game, and not a whining lamentation, as the first half reads.

In the very first play of the ball three of the graduate team made themselves conspicuous by mean playing, and continued it throughout the game. With the exception of the playing of these three and the very just rough handling which they received from the Stevens men, the game was a good one, and played without any display of ill nature on the part of either team. The mistake was in having a referee who did not know the present foot

ball rules thoroughly. The referee refused to warn the men for offside playing and foul tackling and as a consequence each man had to take care of his own rights, which led to frequent quarrels. Foot ball with a good and efficient referee is a capital game, but it requires a man with a thorough knowledge of the game to keep the players in subjection, and only such a one can prevent the unnecessary squabbling among the players.

The day after the game, the *Tribune*, *Times* and *Hoboken Advertiser* all published accounts of the game and with the exception of the *Times* the criticism of the playing was fair to both teams. We publish an extract from the Hoboken paper's account of the game, which shows the opinion of disinterested outsiders and which lacks the spitefulness of the *Times* article (first half) :

VETERANS VANQUISHED—THE STEVENS INSTITUTE FOOT BALL TEAM PLAY A STRONG GAME AND BEAT THE GRADUATE TEAM.

About the roughest and most exciting game of foot ball that has been played in Hoboken for a long time took place on the St. George Cricket Grounds, Tuesday afternoon, the contestants being Stevens Institute Team and the Graduate Team composed of veteran players from Yale, Princeton and Harvard. The Stevens boys, who were on an average much smaller and many pounds lighter than their opponents, expected defeat, but determined to make the graduates work as hard as possible. They played with such indomitable pluck and skill that instead of being badly used up they forced the playing throughout and won a splendid victory over the veteran giants, who showed clumsiness, conspicuous lack of training, and, in a few instances, much bad temper. Three of them, Beck, McIntosh and Harding, began a bulldozing game at the start, and were the instigators of all the roughness in the game. Two or three incipient fights were prevented by the other players interfering, after blows had been struck on both sides.

The Stevens boys never played better, either individually or as a team, and the result was a surprise not only to the graduates and spectators, but to the victors themselves.

LECTURE

DELIVERED BEFORE THE SENIOR CLASS OF
STEVENS INSTITUTE OF TECHNOLOGY,
HOBOKEN, N. J., NOV. 18, 1881.

(Continued.)

Mr. Allen was then shown a set of rules as to the care of boilers, on which he commented as follows :

The first refers to lighting fires. That is a very important direction. That [after reading further,] is one of the most important pieces

of advice that could be given. And yet I have found, in cases where men thoroughly understood their business, and had lighted their fires hundreds of times, relying on the fireman having filled the boiler the day before, they have started their fires and burned and twisted their boilers, through their omission to examine the water gauge.

"Make sure [reading,] that all the valves and cocks below the water line are shut, and open the safety valve when convenient, and keep the man-hole lid off until the water is nearly boiling, in order to let the air out, and to keep the boiler, if internally fired, as cool above as possible until the bottom is heated." That is an all important piece of advice. These directions are new to me; I had not seen them. But a number of explosions are occurring every year from an accumulated pressure in the boiler and an inoperative safety valve. Safety valves are lowered to their places when the boilers are put out of service for some length of time for cleaning or repairing or something of the kind; and when the steam is got up, no care is taken to see that the safety valve is raised from its seat, and under such circumstances, perhaps the man being called away to some distant part of the building, the safety valve refuses to perform its functions; it is set fast in its seat, and the pressure is raised to a point at which explosion occurs. It is remarkable how many explosions occur from such causes. It is an excellent precautionary measure each time a boiler is put out of service, before all the pressure is off the boiler, to raise the safety valve off its seat and tie it up, if there is a pulley line leading from the fire room, or block it up if there is not such a contrivance, until you get up steam again, and that will give you an indication of the formation of steam in the boiler, and then the valve may be lowered to its place. I think these directions are very good. I should be disposed to indorse them to the fullest extent. Touching the rule as to cooling boilers down, that advice is excellent, especially in regard to those boilers which are set in brick work. A great many boilers are injured every year through not having been fired up for a considerable length of time, and it has been the practice quite recently in some parts of the country to blow down the boilers under the pressure, empty them, and the heat of the brick work is communicated to the boiler and distorts it, and there is immense strain on the riveted seams. The boiler is put out of shape, and whatever sediment or deposit in a soft

state there may be in the boiler is baked hard like pottery, on its sides, so that the sharpest kind of a tool is required to get it off. The blowing down of boilers under pressure is one of the most injurious things, and does more, perhaps, to shorten the lives of boilers than any other one thing. The idea of all this is to cool the boiler gradually. By doing that you will avoid any rapid contraction. Sudden expansion and contraction are two of the greatest sources of difficulty that we have to contend with in boilers.

As to the direction respecting incrustation remedies and priming, the overheating due to the use of boiler scale compositions is probably through the carelessness of the attendants who neglect opening the boiler and clearing out such deposits as may be flaking off from the tubes or the sides of the shell. It accumulates in quantity on the fire sheets and prevents the contact of water with the plate, and bulging and overheating occur. Incrustation compounds are largely sold, and they are recommended by a great number of people all over the country, who claim to find them excellent things for removing scale and sediment deposit. So far as I know, the boiler solvents are doing their work to-day. There are a great many cases, like patent medicines, in which people certify to the wonderful results achieved by certain preparations, but it is very doubtful. In the City of New York, for instance, and in our large cities where aqueduct water is used, the water is comparatively pure. There is but little lime in it or anything that will form a lime scale. What is needed there is frequent opening of the boilers to remove incrustation, and the neglect of engineers to do that allows accumulations on the shells and flues, and boiler compositions are introduced for the purpose of freeing the boiler from incrustations. It could, in most cases, be done very well if men were allowed sufficient time to attend to it. Oftentimes they are not given sufficient time.

Questions of corrosion, incrustation and such matters as are generally understood to be largely open questions, are treated more in detail in Mr. Wilson's book on boilers, than in others. I think his book is as reliable in that respect as could be expected from publications touching these subjects. I have regarded it in my own case, and I have heard it highly spoken of. I regard it as the most reliable book on boilers that I have any knowledge of. It is a treatise which is the result of Mr. Wilson's experience. I believe that, for a

number of years, he was the chief inspector of the Manchester Steam Users' Association, and what he treats of in his book are largely matters that came within his own experience.

There is nothing better for general purposes than a horizontal tubular boiler, where the water is sufficiently pure. There are localities where such a boiler cannot be profitably used. Scale will accumulate, and the arrangement of tubes inside the boiler is such that it is a difficult matter to clean it, and the plain cylinder boiler will last longer under such circumstances. The Washington University, St. Louis, has just put in a pair of horizontal tubular boilers, and they sent me a sample of the water that they use, which is so impregnated with earthy matter that they first let it go through a settling pan, and then force it through about forty feet of hay to strain it for their use. All that expense must be put against what they could do with the same water in a flue or a plain cylinder boiler.

In most cases where the water has appeared to be objectionable on account of such reasons as have been described, it is customary to have a tank or some receptacle where the water can settle, and have the feed drawn off from the upper part so that a settling will occur, and that is cleaned out from time to time. Where they use river waters, along the great rivers, the Mississippi, Missouri, and those rivers where the water is very muddy nearly all the time, great care has to be taken.

When well built and taken care of, a horizontal tubular boiler in any of our large cities hereabout should last twenty years. It would be necessary, perhaps, to renew a number of the tubes, but the shell and head, and other parts would be safe to use, if properly designed and constructed, and properly managed and used, for twenty years, and boilers have been used for a period much longer than that.

I think very important information can be obtained, and the proper remedial agents applied to neutralize the effects of waters that would injure the boiler, by analyzing the waters and finding out what in them is injurious. The company have believed that to such an extent, that they have included in their business a laboratory, and have invited the insured from all over the country to send samples of water that scales injuriously, so that they may take the necessary precautions to prevent the great accumulation of this scale and any injury that may result from it. They regard it as enough of an open question to set to work and accumulate systematically the

analysis of waters in connection with the known performance. Water is being sent from the different parts of the country, and I think that by the analysis of the water its general conditions are obtained. That information, however, is not given to the public; it is given to the parties insured. They are told whether the water contains ingredients that would be likely to injure their boilers; and in many cases the report returned has induced them to abandon promptly wells that they put down to save the water tax. The company make no charge for the analyzers where the parties are insured. They assume that their interest is more fully protected by giving this advice, and that the safety of the boiler is better assured.

(To be continued.)

INDICATOR CARD.

It seems a great pity that the Freshmen and Sophomores cannot prohibit others from intruding into their coat room. The greater part of last year the state of affairs was the same. Even for a few days at the beginning of this term a good lock was placed upon the door and everything was supposed to be all right; but, after it had remained that short time it was observed to have changed localities—having exchanged its former position for one at the window sill, with whose assistance we know not. Should it prove to be owing to the Sophomores and Freshmen themselves—and the Sophomores *are* rather a noisy, destructive crowd, while the Freshmen are always supposed to be rough by reason of their very greenness and ignorance of "what's what,"—then we might just as well say nothing and let them find out for themselves that it is for their interest not to kick the door open or rush against it six or a dozen at a time. If it isn't their fault, then we would respectfully draw to it the attention of the one whose business is to see that such things are kept in proper trim. We notice that both the Junior and the Senior coat rooms are safe from the invasions of intruders, and we ask why such could not be the condition of things in the Sophomores' and Freshmen's room. One idea which we wish to suggest is to have lockers—each student his own locker. This, for many reasons which are obvious to all students, would be a great convenience. The lockers should be placed in the coat room;

and to have them, say, five feet high or long (in case they should be made like drawers), one and a half broad and one deep (such as would accommodate an overcoat), would be plenty large enough. Then, in this case, one could put his T-square away for the summer or for the short vacation, and it would thus be protected from the dust and dampness which is quite necessary to do in order to keep a T-square in anywhere near good order. Then, again, hats would not be knocked about, neither would they nor overcoats be taken by another, in mistake, of course. Staples having been fastened securely, each student would be required to furnish his own padlock, thus making himself alone responsible for the security of his own effects. This, we think, would be a cheap and effective plan; and, if thought advisable, a small rent could be charged, which would soon compensate for the original outlay. Any action in this matter would please the students. At least let us have the lock on the door!

NOTES from the PROFESSION.

An electric headlight for locomotives has been lately invented, and after a test of six months, during which it has given great satisfaction, a company has been formed at Akron, O., to manufacture it. A three horse power rotary engine, placed directly in front of the cab of the locomotive, is supplied with steam from the boiler. This furnishes power to a small dynamo fastened to the foot board of the locomotive at the left side, supplying the current for the light, which is equal to 2,000 candles. The mechanism of the lamp is kept a secret.

The London and Northwestern Company has made a progressive step in regard to railway lighting in their Liverpool and Manchester line. The carriages are lighted by 20 candle Swan incandescent lamps, the current being supplied by a dynamo run by a Brotherhood engine on the tender, the steam supply coming from the locomotive boiler. Each compartment has a duplicate lamp, which is lighted immediately should the other meet with accident; a regulator and lamp on the foot plate places the train lights under control of the engine driver. The *American Engineer* suggests that the system is a clumsy arrangement, and that it remains for American in-

genuity to supply some device, as compact and self-contained as the Westinghouse air brake pump, to be attached directly to the locomotive. It also claims that the details of a system of electric train lighting ought to present less difficulties, in their working out, than those encountered in the development of the air brake, and, as a measure of convenience and safety, it is of next importance. There is no doubt that American saloon coaches offer special facilities for electric lighting as compared with compartment carriages.

The model of Capt. James B. Eads' proposed Tehautepec ship railway, on exhibition in New York, has been visited and duly admired by a number of the students from the Institute. The model is in itself a beautiful thing, and the arrangement is both interesting and simple. A car, resting upon a great number of wheels, is run out upon a pontoon with three pairs of rails which fit exactly to those on the land. The pontoon is then submerged by admitting water into it through sluice gates, regulated from the top of two towers attached to the deck of the pontoon, and between which there is sufficient width to allow the ship to pass. The vessel to be transported is then brought over the pontoon and held in the correct position over the cradle on the car. A system of hydraulic rams, forming part of the cradle, is brought up against the ship and fitted exactly to her shape; in this position the water valve admitting pressure to the rams is locked, so that her weight is evenly supported from stem to stern. The pontoon is now pumped out until the level of the rails on deck corresponds to that of the rails on land; locomotives are then backed down and fastened to the car, and all is ready for the journey across the land. Of course, curves of short radius would be impracticable in the railroad, the minimum radius of curvature allowed by the engineers being 15 miles. Where the nature of the country requires sharp curves, floating turn tables are to be provided; in the survey of the proposed line five such points have been found. These turn tables consist of pontoons, somewhat similar to those used in raising the ships, placed in segmental basins sufficiently large for the pontoons to rotate around several degrees of a circle, according to the amount of deviation the direction of the road may require. The proposed pontoons as designed are 450 feet long, 75 feet

wide, and 15 feet deep. The total length of the railway, according to the survey, is 160 miles.

For the last two years experiments have been making toward the warming of cars by means of a heat giving liquid, which continues for several hours to throw out heat with approximate regularity, for a time, depending upon the original degree of heat imparted to the liquid. The cars of the De Kalb Avenue line, in Brooklyn, seventy in number, have been heated by this system during the last winter to the satisfaction of the company, and presumably to that of the public. A large iron pipe containing the compound passes under each seat of the car; through the centre of the pipe runs a smaller pipe, through which steam is passed when it is desired to heat the compound. When heat is applied to the pipes from a steam boiler in the station, the crystals in the acetate of soda used are liquefied, and remain so until the temperature begins to fall perceptibly. Then the crystals begin to form and the liquid throws out an increased heat. A thermometer taking the temperature of a pipe of the heated compound shows that during the first hour or two there is a slight fall of temperature, then a sharp rise while crystallization takes place, and then a gradual fall. A record of the temperature of one car kept during twenty days showed that, after each run of sixteen miles, the temperature in the car was, upon an average, less than one degree lower when the car returned to the station than when it started out. The cost of heating cars by this system is said by the company which controls the patents to be no more than for stoves, while the heat is pleasanter and the atmosphere is free from gas and smoke. The compound in the pipes will last for an indefinite number of years, for all that is known to the contrary, being hermetically sealed.—*Mining and Scientific Press.*

Mr. L. T. Goff, in an article on this subject published in a recent number of the *American Railroad Journal*, holds that "railway" is a better term than "railroad," "locomotive" more exact than "engine," "station" than "depot," "car" preferable to "carriage," and "conductor" to "guard;" that "driver" is better than "engineer," and "stoker" better than "fireman."

We find the following in the *Mechanical Engineer* for June 28: "The English govern-

ment recently appointed a commissioner to visit this country and report upon the technological institutions, and after visiting them personally the commissioner—Mr. William Mather—says of the Stevens Institute: 'My inspection of the school convinced me that, for mechanical engineering alone, I had never seen its superior. The theory and practice of the science are never separated through the four years' course. The name of Professor Thurston is well known in the engineering profession in England, and the fact that he has charge of this department is a guarantee for the training of the students in the principles of science, as well as in their application to mechanical construction.'

The announcement to the effect that the officers of the New York Elevated Railway were ready to consider electricity as a motive power for their trains, has excited much interest among inventors and scientific men. The design seems to be to investigate what claims electricity in a financial as well as a mechanical point of view has for locomotion, and by experimental trials of different designs to promote the development of the electric motor. There are a great many complaints against the elevated roads at present in regard to noise, smoke and steam, dropping water and falling ashes, all of which would be entirely corrected by use of electricity. We think that here is an excellent opportunity for bringing before the public mind the subject of electricity as a power in locomotion, just as the popular interest has been awakened in regard to electric lighting. If electricity is to be the motive power of the future, the sooner inventors are engaged to perfect their ideas and let others have the results of their investigations, the sooner will the problem be solved.

A master key has been exhibited at the Wolverhampton Exhibition, England, which is capable of opening 22,600 patent lever locks. Each lock may be different in its wards and combinations. The key weighs three ounces, and is nickel plated. It has taken the inventor three years to complete the drawings of the different wards and combinations, which enabled this extraordinary product of human ingenuity to be made. Master keys capable of opening 100 different locks have been known to the trade for many years, but nothing has approached this key before.—*Ex.*

ATHLETICS.

LAFAYETTE vs. STEVENS—NOV. 15, 1884, AT EASTON, PA.

Lafayette's players were :

Rushers : Frey, Young, Reeder, Rohrbach, Wiley, Zerr and Wells.

Quarter Back : Hannue.

Half Backs : Pridgeon and Updegrove.

Full Back : Beatty.

Captain Baldwin tried an experiment in placing his men, and many errors and much loose playing was the result, due principally to the lack of practice of the players in their new positions. Campbell played in the rush line, Cotiart and Kletzschn half backs, and Baldwin quarter back, the other places being filled as usual. Both Kletzschn and Cotiart made several good runs, but the ground gained was almost immediately lost by errors.

In spite of the fact that the sun was in the faces of their opponents and that Stevens played down hill, Lafayette succeeded in scoring and Stevens failed. When the ball was near Stevens' goal line, Wells made a touch down, but the trial for goal failed. When time was called, the ball was within ten yards of Lafayette's goal, having been carried there by Cotiart and Kletzschn.

In the second half Healey played quarter, Baldwin and Campbell half, Cotiart and Kletzschn going into the rush line. After several short runs by Baldwin, Kletzschn caught the ball a little back of Lafayette's twenty-five yard line and made a fine long kick, scoring a goal from the field. Runs by Glasgow and Kletzschn took the ball within ten yards of Lafayette's goal line, and Baldwin forced it through, made a touch down and kicked a goal. Forcing by Kletzschn and Burhorn and a short run by Glasgow again took the ball in front of Lafayette's goal posts and Cotiart made a touch down, Baldwin kicking the goal from it. Wiley kicked the ball from the centre of the field, behind Stevens' goal line, where Adriance touched it down. It was set in play with a short kick by Dilworth. Healey caught it and ran to Lafayette's twenty-five yard line, when time was called. Score : Stevens, 17 ; Lafayette, 4.

LAFAYETTE vs. STEVENS—NOV. 27, 1884, AT HOBOKEN.

The teams were composed as follows :

Lafayette—Rushers : Frey, Young, Wells, Rohrbach, Zerr, Iverton and Reeder.

Quarter Back : Hannue.

Half Backs : Pridgeon and Davidson.

Full Back : Beatty.

Stevens—Rushers : Cotiart, Burhorn, Dilworth, Kletzschn, Hart, McCoy and Greenebaum.

Quarter Back : Healey.

Half Backs : Baldwin and Campbell.

Full Back : Adriance.

In the second half Baldwin took Healey's place as quarter back, and Johnson played half back.

Stevens had much the best of the game, making twelve touch downs, from five of which goals were kicked—58 points to Lafayette's 0. Greenebaum made 2 of the touch downs, Healey 1, Kletzschn 3, Hart 1, Baldwin 2, Johnson 2 and Cotiart 1. Baldwin and Kletzschn did good forcing, Johnson and Cotiart made several good runs, and the rushers got down on the ball better than usual. The only time the ball was near Stevens' goal line Cotiart caught it, when it was thrown to Lafayette's end rush, and passing the half and full back, ran the whole length of the field and made a touch down. Mr. Schultz, of Yale, was referee. Mr. Swift acted as umpire for Lafayette and Mr. Munkwitz for Stevens.

On Tuesday, Nov. 18, at Hoboken, Stevens played a team consisting of graduates of Yale, Harvard and Princeton, and proved too much for the veterans who, besides not being posted in the changes which the game has undergone since most of them graduated, lacked training and team practice very much. Two or three of their players commenced a bulldozing game, and if later on they were used rather roughly they have only themselves to blame. The referee, Mr. Brown, of Yale, was, like the members of the graduate team, very much behind the times, as his decisions and failure to warn men for offside play indicated. In the first half, Stevens made 11 points, a goal from the field in fine style by Campbell, and a touch down by Cotiart, from which Baldwin kicked a goal. In the second half, Healey scored a touch down for Stevens, and one for the Graduate team, the final score being Stevens, 15 ; Graduate team, 4.

The alumni resident in and about Baltimore are considering the idea of forming a Stevens Alumni Association of Maryland, and of having a meeting and banquet each year, at some time during the winter.

STUFFING BOX.

Junior shop work is at a discount.

Our waste paper basket—where is it, please?

You can't read a French fable out loud and eat chewing gum at the same time.

"Reddish red," a new shade suggested by a Junior for a substance in chemistry.

Don't buy your books for next term until the Faculty announce the vacancies.

Why don't the Freshies do something to distinguish (or extinguish) themselves?

"Continuosity" is the last straw that broke the Campbell's back. Send him a dictionary.

Perpetual Motion—"Well, sir, now, sir, I can tell you, sir, all about perpetual motion, sir."

"Perpetual Motion" thinks of buying a whitewash brush to line in his "eclipses" with.

Birdsall, '86, has been taking some very good photographs of his class. Other classes need not apply.

The new skating rink will be a great feature this winter to the unconditioned. Be sure and get season tickets.

Why do Engineer Roebling and "Jack Frost" resemble each other? Because they are both bridge contractors.

A friend of one of the editors exclaimed: "Did you really go up town last evening to see Miss — in those knee breeches of yours?"

We hope the holidays will be a season for refreshing exhausted brains, and that there will be more contributions to THE INDICATOR when college reopens.

Freshmen! The Faculty will be "at home" for one week commencing Dec. 11. Food for thought will be furnished during the day from 9 a. m. to 4 p. m.

The course in moulding has the one great feature of giving those so inclined an opportunity to play in the sand—the *other* advantages will be referred to when noted.

Our worthy janitor has kindly furnished the Board with a neat P. O. Box. This is a great help to us; it acts as a home for our exchanges which otherwise would *wander* indiscriminately among the students.

Why does not '87 petition the Faculty for something? The class is fast losing the reputation of Sophomores. Try a petition for a gymnasium. It won't amount to anything, of course, but just petition at any rate.

A member of '88 extinguished himself the other day by telling the Prof. that language originated in the "owld country." Notice of wake hereafter. Whiskey and tobacco promised as inducements to attend.

Scene—Prof. C.'s room—Monday morning. T. K., at the blackboard, gets problem right by mistake. When told of it he staggers and winks both ears. Falls into a chair, lost in wonder. (Sneaky music by the class.)

A man who wanted trains on an Illinois railroad to stop near his farm, put up a sign, "Run Slow," on a culvert. This worked very well for four years, until some one got tired of running slow, and discovered the fraud.

"Jumbo," the Black, our janitor's constant friend, who held a large place in our affections, has gone. We suppose "James Donaldson," the yellowish yellow dog, has been substituted to take the wire edge off our grief.

'87 feels that it is much honored by the presence of Vanderbilt among its numbers. He matriculated under the pseudonym of Bandaret, but his incognito has at last been disclosed by our professor, who "is curious about names."

It was in the Literature class:

Prof.—"Mr. Blank, was there any other species of poetry during this period?"

Mr. Blank (who was out the previous evening and has gotten things somewhat mixed)—"Oh, yes; there were *ballets*!"

"Gouging and biting" are the only exercises prohibited by foot ball rules, and they ought to be, too, because when you hit a man you *only* knock a tooth out or break a collar bone, but to bite or gouge is *ungentlemanly* and rough. Next year's team will probably wear brass knuckles.

The college pin subject is in the hands of a committee, some few of which are working up designs. In '86 one committeeman apparently is doing all the work, and we would recommend that one of the inactives be replaced by Mr. King, who was the originator of the idea for having a college pin.

"Everlastin's," otherwise known as Perpetual Motion, completed an eclipse the other day, of which he was very proud. Some kind friend stole it, and being unable to get the keys of the bulletin board, posted the paper in a conspicuous position, to the infinite amusement of the rest of the class.

Isn't it strange? By beating a poor team composed of graduates from several colleges who had never played together before, and some of whom had not played within four years, Stevens has made more stir this season than any other college except, perhaps, Yale and Princeton in their big fight Thanksgiving day.

It is a delightful sensation of doubtful pleasure and satisfaction which comes over one in the Chemical Laboratory when he takes a bottle labelled "dilute acid" and pours a few drops of the *dilute* acid on a filter and sees the paper and substance he is working with both disappear. Such things occur in the laboratory, and a whole afternoon's work is lost through some one's carelessness.

The Glee Club has organized, with Mr. Camp of Wesleyan, as leader, and with the following members: First Tenors—Cotiart, '86; Fuchs, '86; Smith, '87; McElroy, '87. Second Tenors—Baldwin, '85; Lilly, '86; Morton, '86; Crisfield, '87; Flack, '87. First Basses—E. Burhorn, '85; Coker, '88; Fuller, '88; McLean, '88. Second Basses—N. McLean, '85; Clerk, '85; Hart, '87; H. Hubbard, '88.

A new branch of engineering is being inaugurated with the Freshmen in Prof. MacCord's department. It is the laying out of race courses. The designs produced are excellent; indeed, it is acknowledged by frequenters of the turf that courses of elliptical form are the best. Such is the conclusion that one arrives at after seeing some ellipses, so called, constructed by Freshmen evidently unsparing of ink.

The prevailing fashion this winter, according to one in authority, is thus disclosed during a conversation. Scene—High Life. First

Young Lady (criticising friend's taste, emphatically)—"Well, I shall wear nothing but linen collars and cuffs." Second Young Lady—"Well, I expect to use nothing but lace this winter." And the weather prophets all predict "cold winter" too. Can't the Legislature interfere?

We have all enjoyed Thanksgiving, everyone of us, including our worthy janitor. His turkey must have grown in richer fields than those of Jersey, for it has left unmistakable marks behind that would lead us to suppose the turkey had tried to eat our worthy janitor. Still we are in error, for o. w. janitor states that his turkey positively was "cooked brown," and that "a stone fell up from the roof and hit him in the face." Strange!

It is reported that the students will be prohibited from taking machines apart, and that, from this time on, all machine sketches will have to be made from patterns and from models. This, we fear, will take away that interest which is always invested in a machine if we know it is a real one, and which mere "mummies" cannot sustain. Then, too, patterns are always made purposely a trifle too large, hence accuracy of proportions could not be attained.

The Sophs are very much pleased with Prof. Kroeh's final French examination, since they become quite proficient as copyists in transcribing from the Comptes Rendus that which each one is to translate. We think greater satisfaction would result if students were allowed to take any books, except those which could not be replaced, from the library, to be returned within a given time, for our library is not what a library should be; it is simply a thoroughfare, and a dimly lighted one at that, even for this purpose, not to speak of the former.

We do not understand why the building should be flooded with sulphuretted hydrogen. Of course, we are rather fond of the pleasing odor, but to the uninitiated entering our halls it would seem to be a needless waste of "fragrance." We are not allowed the use of the gas generator in the basement, for the reason that it is *inadequate* to the demands of a *few* students, yet the whole building can be surcharged with the soothing mixture, and the generator, when visited after the lower rooms had signified a plenty and the upper floors were receiving their share, was as lively as ever, and showed a willingness to force the roof off if given time.

PERSONALS.

'81

A. C. HUMPHREYS was elected a member of the American Society of Mechanical Engineers at their recent meeting held in New York.

'84.

W. S. ALDRICH had charge of the Ball Engine exhibit at the recent Electrical Exhibition in Philadelphia.

J. A. BENSEL is with the Engineer Corps of the Pennsylvania R. R. in the Maintenance of Way Department at Jersey City.

A. FABER DU FAUR, JR., is with Van Santvoord & Hanff, patent attorneys, 41 Park Row, N. Y. City.

R. C. FEARN will have charge of the exhibit of the Atlanta Engineering Co. at the New Orleans Exposition.

W. H. PIERCE, JR., is with the Philadelphia, Wilmington & Baltimore R.R. at Wilmington, Del.

KENNETH TORRANCE is in the Testing Department of the Worthington Pump Works, in Brooklyn.

W. S. TUTTLE is with the Ferracule Machine Co. at Bridgeton, N. J.

LYALL, MORRIS, REA and WURTS are in Germany, and have constituted Hanover as their place of rendezvous.

EXCHANGES.

The *American Engineer* of Nov. 21 has a comprehensive discussion of the "New Standard of Horse Power of Boilers," which all should familiarize themselves with. In the time of Watt, the figure was one cubic foot of water evaporated per hour, that amount being fully adequate to develop a horse power in the steam engine of that time. Since that date, however, engines have been greatly improving, until at the present time about thirty pounds

of steam per hour per horse power only is needed in a good non-condensing engine. The standard since 1876 has been the evaporation of thirty pounds of water with dry steam from feed water at 100 degrees Fahr., and under a pressure of seventy pounds per square inch above the atmosphere.

The standard recommended by the committee of the Society of Mechanical Engineers on Boiler Trials, is the equivalent of an evaporation of $34\frac{1}{2}$ pounds of water from feed water at 212 degrees Fahr. into steam at the same temperature.

In the same journal is given an abridged report of U. S. Testing Board, Prof. R. H. Thurston, Chairman, on alloys of copper, zinc and tin. The original report contains sixty printed pages covered with tables of the tests of each alloy.

The *Amateur Mechanics*, a London exchange, is a thirty-five page journal full of interesting and instructive matter in language intended to be understood by all. Its numerous illustrations are a sign of enterprise and prosperity.

Among the college journals the exchange editor finds a large mass of books of various forms and colors, and of variable merit. The stock of personals and locals are, of course, little intended to interest those outside, so they are hastily scanned. Occasionally a good article is hit upon.

The *Amherst Student* has a funny man who had discovered a way to encourage contributors to the paper. He offers two dollars for the funniest article handed to him before the next issue. We fear it will come to this before THE INDICATOR gets many contributions from alumni or students.

Another *Chronicle* tells us all about affairs at Ann Arbor, Mich.

COLLEGE WORLD.

HARVARD.—A new club, called the Shakespeare Club, has recently been formed.—All the studies are now elective.—The question of compulsory attendance at morning prayers is again agitated.

YALE.—There will be two weeks recess at Christmas instead of three, as formerly; but to make up for this, Commencement comes a week earlier.—One of the studies taken by the Senior class is considered so difficult by the instructor, that he has given them permission to use "skinning papers."

PRINCETON.—A plan is on foot to give a course of twelve entertainments, consisting of lectures, readings and concerts, during the coming winter; for this purpose a theatre has been secured.

CORNELL.—Mr. Hiram Sibley has again come forward with pecuniary assistance for the University. A series of shops is in process of erection. The work done in these shops will be practical, and some of the articles made by the students will be sold, thus making the shops partly self-supporting. In addition there will be a mechanical laboratory to be used in testing materials, etc. For a fuller account of the shops, we refer to the *American Engineer*.—The Freshmen, with the approval of the Juniors, have published a resolution condemning cane rushes.

IN GENERAL.—A Chinese girl is studying at the Ohio Wesleyan University.—Of eight \$200 scholarships recently awarded at Cornell, four went to lady students.—With the exception of Harvard, the Mass. Institute of Technology has the largest Freshman class of any college.—The legislative body of Ireland has desired to open next year a Public Institute of Ireland.—Out of 1,500 students at Oberlin, last year, only one took the scientific course.—Some of the students of the University of Michigan are asking for the organization of a battalion and the appointment of an army officer to instruct them.—At Queen's College, Kingston, students are not allowed to recite or attend lectures unless clad in the prescribed academic gown.—Brown is to have an \$80,000 gymnasium, and Exeter, one costing \$50,000.

CHIPPINGS.

A posteriori reasoning: "Dear me," gasped Mrs. Knowall, "there is a terrible item in the paper. My, how the poor man must have suffered!"

"What is it?" asked her husband, coming to her side.

"Why, one of these poor walking match fellows swallowed a sponge."

"What! Let me see!"

After carefully reading the article Mr. K. threw the paper down, growling:

"You women ain't got a grain of sense; it don't say he swallowed a sponge."

"I know it don't in those exact words," answered his wife, then brightly continued, "but how could he throw up the sponge if he didn't swallow it?"

—*Speculum*.

Visitor—"Does not smoking interfere with drawing?" Draughtsman—"Oh, no! In order to smoke I have to draw."

Professor in Systematic Theology—"Where is the lesson to-day, gentlemen?" Student—"It begins at good angels and goes to the devil."—*Ex*.

AN UNKISSED KISS.

I wished—if I only had dared.

She frankly held out her small hand;

And I know that she wouldn't have cared.

But I didn't have quite enough "sand."

I was making my farewell call,

For a moment I held her small hand;

"Good night, Miss Pauline"—that was all.

Do you think that she would have cared?

I wish—if I only had dared.

—*Record*.

"I wish you were taller," said a lady to the famous actor, Garrick. "Madam," said he, "I should be very happy to stand higher in your estimation."—*Ex*.

When a man sets about painting the town red, he very rarely uses water colors.—*Life*.

Teacher—"Feminine of friar?" First Bright Boy—"Hasn't any." Second Bright Boy—"Nun." Teacher—"That's right." First Bright Boy—"That's just what I said."—*Harper's*.

Hark! and oh hear, the piano is banging—

(Sonnet and canticle, chant and glee)—

The fellow upstairs his guitar is a-twanging,

The children are singing a jubilee.

Just over the way there's a banjo, I think,

With its "Pink-a-punk-pank, punk, pink, pank, pink;"

And down at the corner the man with the flute

Is rending the night with a tootle-too-toot.

And oom pah-pah, oom pah-pah, bra-a, bra-a, booom!

The brass band is practising up in its room.

—*Ex*.

* THE *

Stevens Indicator

Vol. 2.

* January, 1885. *

No. 1.

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HOUGHTON, N. Y.

* Stevens Institute of Technology. *

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THE STEVENS INDICATOR.

THE

Stevens Institute of Technology,

SCHOOL OF MECHANICAL ENGINEERING,

FOUNDED BY THE LATE EDWIN A. STEVENS,

—AT—

HOBOKEN, N. J.

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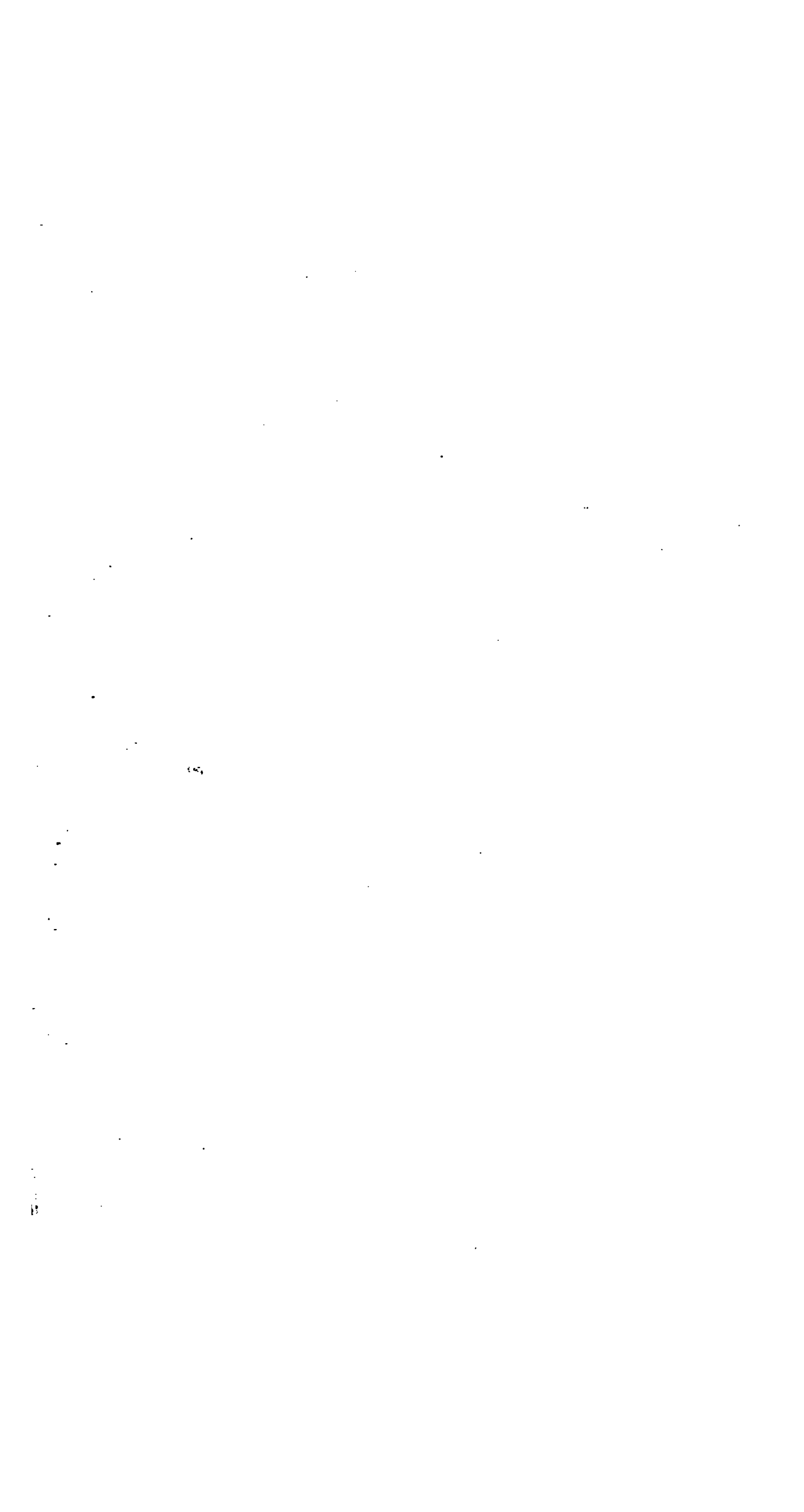
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Said this Student: "I think it is best
 To study to-morrow the rest,"
 But when he awoke
 He thought it no joke:
 And directly this thought he expressed.



This condition of affairs could not long continue. Revolution was inevitable. The revival of learning began, and with it there arose a few great men, who, by their bold opposition to time honored bigotry, were to win from future generations that proudest of all names—the name of hero. Copernicus was the first, and his dying legacy to men was a firebrand which Galileo caught up and hurled into the very centre of the Vatican. This set the world on fire. A new truth had been discovered, the infallibility of the church had been shattered and science had begun. In vain the Pope coaxed and threatened, banned and anathematized. In vain the Inquisition performed its horrid work. All these were but passing hindrances to the resistless advance of the newly founded truth. Men *must* think, and intellect *must* be free.

It is a remarkable fact that new truths have always begun as heresies. Science, as well as religion, has her long list of martyred heretics; as Galileo had to suffer for preaching the impious doctrine that the earth moves, so all great leaders in science, from this day to the present time, have been forced to endure some form of martyrdom. Their lives have been self sacrificing and heroic, and the tardy honors of the world have generally been bestowed only upon their memories. Such men were Harvey and Jenner; the one, for his discovery of the circulation of blood, persecuted to poverty and death; the other, after his great discovery of vaccination, regarded by his former associates with loathing, as but little better than a brute. It was this spirit of heroism that guided the helm of Captain Cook's little vessel as she bore the bold sailor through unexplored seas from pole to pole. It was this spirit that sustained the hearts of Livingstone and Stanley while facing the death charged wilds of Africa, and it was this spirit that led Layard and Rawlinson to brave the malarial dangers of their antiquarian exhumations in the Orient. The illustrious Darwin, regarded by ecclesiastics of every sect as a kind of scape goat for the whole human race, denounced, ridiculed, spurned from pulpit and platform, for long years in bold defiance of public prejudice, continued his toilsome search for truth, and to-day the thinking world honors him for it and builds monuments to his heroic memory. But we need not leave home for examples, when each day we are reminded by that airy structure floating gracefully between our two cities, of one from whose strength and health and life, it may be, its fabric has been

woven. You may search the pages of history, ancient, mediæval and modern, and from every chapter, from every page, this idea will confront you—the men of science are all heroes. The spirit of this mighty phalanx rivals that of Sparta. Trials, deprivation, torture, death are the hardships by which they have won their victories.

But what has this heroism accomplished? It has by a persistent effort overcome this opposition which so long retarded it. It has converted religion from hostility to friendship, and, by acting as a great commentary on the Bible, has rendered invaluable service to the cause of divine truth. By the aid of this light we are enabled to see more clearly the greatness of the divine mind, and to form some slight conception of the sublimity of God's provision for man. But it is in material results that most has been accomplished. There is scarcely a convenience or a comfort that distinguishes the civilized present from the barbarous past that is not due to the heroic efforts of science. Even that which we most frequently ascribe to nature, is only nature harnessed by the scientist to do our bidding.

But the best example of the results of science is the nineteenth century itself. Living as we do in an age of activity, we are not disposed to sit calmly down and institute comparisons between the centuries. Yet, without comparison, we are conscious that we live in an age of marvels paralleled only by the age of Hebraic miracles. Indeed, it is safe to say that the triumphs of science in the last seventy years are greater than the combined scientific achievement of all the preceding ages of man. What better proof does this assertion need than the events that are occurring every day around us in the application of electricity to the common affairs of life? In a word, science is the grand impetus that impels mankind.

It is a trite saying that "to-morrow never comes." What we now designate as to-morrow, when it comes, is called to-day. And so it is in science. The continuity of its progress is unbroken. The dreams of the past are realized in the present; the unsolved mysteries of this generation will become commonplace facts in the next. But the men of science are ever looking onward and upward into that time which lies beyond, where the goal of their hopes may yet be reached; and they are led by a guiding star, whose light, as steadfast as truth and as pure as religion, must sometime illumine the world.

C.

WHEN I FIRST CAME TO STEVENS.

Some one has said that a person can live for years at a place and yet will not notice things which seem very prominent to a stranger. It seems as if habit dulls the faculty of perception and contrast sharpens it. In proof of this let one of our acquaintances, whom we have been accustomed to see with turned down collar and moustache, come out the next day with a cuff around his neck and "sideboards" on his cheeks, how promptly this change will be noticed! or else, let your lady friend forget to "put on" her false teeth—do you mean to say that you would not "catch on" immediately? Of course I know very well that you would be polite enough not to let her see that you find something missing, but still—you are not blind!

So it was with me. Coming from the everyday life of the world, I could see on being launched, so to speak, in your midst, many things which no doubt have been passed over by you as deserving no attention. You reminded me of the ignorant barbarian, who looks up to the sky, not at all surprised to find there the glorious sun apparently gliding on gently to yonder blue mountain chain; it is so *natural*, people say, that it is hardly worth while glancing at. I was, like the inhabitant of some distant star, suddenly dropped on our earth. What I saw and noticed I shall impart to you.

First of all, there was that building, massive, heavy, simple! The architect of those tough hewn stones evidently thought that "beauty unadorned was adorned the most." Still, I know not why, the structure looked to me like a stronghold, a fort or a monastery. It required very little imagination to fancy those colossal embankments "peopled" with cannons and similar toys. But lo! it could not be a fort nor a cloister; now, indeed, I thought of a lunatic asylum, for on a green lawn a wild assemblage of wilder folks were torturing what seemed to me a rather large watermelon. One of the fellows, trying to stop the rebellious watermelon, was knocked down, and soon lay buried under a pile of other kicking individuals, all of whom were anxious to deal that poor watermelon a blow. Not seeing any keepers around, I naturally concluded, after some hesitation, that the house was not an asylum. Then at last I saw various books strewed all over the field, and five young men on the stoop with "Tam O'Shanter," whose (not the T. O'S.'s) chief

characteristic was—a paper cigarette, which facts convinced me beyond a doubt that the building was the place I sought for. Mustering up courage, I stepped in to look around.

The first thing that struck my view was an old coffin in the corner with a narrow hole at the top, and closed by a huge padlock. (This I was told was the letter box). Right next to it I saw something white on the wall; looking nearer I found that it was a bulletin board, probably made of wood. I say *probably* because all I could distinguish was the beautiful tapestry of boarding house advertisements. There was also a so-called *rooster*, which gave the names of all the professors, with numbers after every one of them (probably marks for deportment). I found out also that somebody had a set of drawing instruments for sale, and other very interesting matter.

Opposite the door is a small staircase, which leads down to the—well, I was afraid to descend, so that I cannot tell you. The door of the chemical laboratory was closed at the time, so that I escaped uninjured to the so-called library. Books there were, indeed, stored away in beautiful order in the cases, and on the shelves, but the five Tam O'Shanter *with* the cigarettes had in the meanwhile left off their amusing operation of gaping at the passers by, and had seated themselves in romantic groups on the tables and on the chairs. How kind it was of the builder to fasten these chairs and tables with immovable patent bolts to the floor! for the mere thought of a cigarette, I mean a Tam O'Shanter, with his feet high up in the air, and balanced on a shaky chair, makes my hair stand on end.

Suddenly a fire alarm was sounded. The men ran in from the lawn, and prepared themselves, not to extinguish the fire, because there was none, but to go to their respective recitations. Soon the Tam O'Shanter disappeared, leaving only gas and smoke behind them, and I was left alone with the books.

Now the door of the laboratory was slowly opened, a small boy looked cautiously around, and finding no one stepped boldly out dragging a *yaller* dog as big as himself. An elderly bare faced professor (at least that is what I thought he was, but found out later that he was the son of O'W. Donald the Great) was kind enough to open the door with an important air for the dog and the boy, and then to go away his head bowed down, his hands dangling at his side with an uncertain motion, and with his feet sometimes apparently getting in his way. In a tone of voice that would have been

musical had it not been out of tune, thrice he called out solemnly: "Oh, George! George! George!" And echo answered—but you know what echo always answers, don't you?

That day I did not get any further than the library, so that my tale of one day is told. If you want to hear the others, you will have to wait till the next INDICATOR appears.

Expecting that you will buy up all the copies in advance, I humbly inform you that I am a
FRESH MAN.

JUSTICE TO STOVES.

In the fall the rural householder brings forth the stove from its six months' imprisonment, and with fear and trembling undertakes the dangerous task of putting it up. Few fatal stove casualties are reported by the press, but the sudden and enormous increase in the demand for arnica and divorces, which is shown by the records of rural druggists and rural courts, and which occurs every fall, is a sad proof of the danger which menaces the man who grapples with a large and violent stove.

There is a melancholy sameness in the manner in which the stove displays its unwillingness to be handled by man. Like the scorpion, which argues with its tail, the stove uses its articulated pipe as its instrument of attack and defence: So long as the householder confines himself to carrying the stove from place to place, it rarely attacks him, but no sooner does he meddle with its pipe than its fury is aroused. His first effort is to connect the lower joints of the pipe with one another, and here he is met by a determined obstinacy which is worthy of an independent and self-poised pig, or even of an experienced army mule. The joints refuse to come together, and bend all their energy toward gratifying a fiendish thirst for fingers. Sometimes, after a long struggle, the wrong joints are forced together, and when the householder discovers his mistake, they refuse to be separated except at the price of more blood and additional scraps of cuticle. Nothing but cool bravery and determined perseverance will succeed in properly joining the three lower joints of a stove pipe, and when this victory has been won, the worst of the battle is yet to come. It is not until the householder has mounted a step ladder, and undertakes to place the upper "elbow" on the pipe and to insert it in the chimney, that the strength, activity and

malignity of the stove pipe is fully displayed. Its favorite feat is to release itself suddenly from the hands of its antagonist, strike his foot with its whole weight and its sharpest edge, and then to roll on the floor in evident convulsions of joy. Occasionally the upper "elbow" makes a vicious plunge for the householder's head, and instances are on record in which it has violently torn his nose from its foundation or driven its fangs deep into his skull. Efforts to subdue it with clubs or hammers are seldom effective. Usually the more the stove pipe is pounded the more unruly it becomes, and the more resolutely it refuses to enter the chimney hole or to adhere to the stove.

Startling as the assertion may seem, it is by no means certain that these terrible conflicts are necessary, or that mankind cannot live on peaceable terms with stoves and stove pipes. It is an assumption, which is unsustained by satisfactory evidence, that the stove is necessarily untamable.

There is good reason to believe that were the stove treated kindly and intelligently, it would become as harmless as the grate or the furnace.

Professional stove fanciers who deal in stoves never have any difficulty with them, and can always put up a stove without exciting it to the slightest demonstration of hostility. The average householder is probably, to a very great extent, responsible for the violence and bad temper of which he accuses the stove. He keeps it during the summer in close confinement, where it mentally rests and naturally grows morose. He does not make himself familiar with it and accustom it to be handled, but relies wholly upon his brute strength to keep it in subjection. Moreover, it must not be forgotten that when he mounts the step ladder for the decisive struggle, he is almost invariably hot and excited. The presence of his wife, who stands near the foot of the ladder, expressing those mild and impracticable views as to the uses of the hammer, which are so characteristic of her sex, and so well adapted to madden the other, has also its share in increasing his nervousness and in rendering him unfit to deal with his difficult task. In these circumstances he is apt to resort to hard and violent treatment where it is not needed, and he ought not to wonder if he thereby excites the fear and resentment of which he subsequently complains. The mere fact that when a man is standing on a step ladder with a stove pipe in his arms, he

betrays a readiness to undervalue his wife's intellect, and to accuse her of "everlasting chattering," speaks volumes as to his state of mind. The disasters incident to the season of putting up stoves are proofs, not of the wildness of stoves, but of the irritability of husbands, and it may be safely asserted that an irritable man is unfit to deal with stoves or with any domestic animals. Let us then, instead of persistently treating the stove as though it were the inveterate enemy of the race, try the effect of kindness and gentleness.

Weeks before the stove is to be put up, the pipe should be brought out and accustomed to the presence of the family. Its joints should be allowed to lie on the rug or under the table, and from time to time they should be gently brought into contact, so as to accustom them to their approaching duty. When the hour for putting up the stove arrives, the householder should send his wife out of town, and after engaging a large Irishman with a club to remain within call in case of any extreme violence on the part of the stove, he should proceed to put it up alone. Possibly this course of treatment might fail of securing the desired end, but at all events it is worth trying. The assumption that intelligent men cannot live in peace with stoves is simply disgraceful, and all humane persons should be anxious to prove its falsity without delay.

W. L. ALDEN,
"Domestic Explosives."

ENGINEERING NOTES.

The Rockaway Electrical Railroad Company has been recently incorporated, and a survey for the proposed line has been made between Far Rockaway and Rockaway Beach, which makes the length of the road about five miles. The road is expected to be opened for travel by the first of July; contracts for building are soon to be made, and the work will be commenced immediately after. It is intended to lay the rails on an iron superstructure, similiar to that of the New York elevated railway.

One of the largest stationary engines in the world is the pumping engine "President," at the Friedensville zinc mines, Lehigh County, Pennsylvania. It is run with sixteen boilers,

and develops 5,000 horse power, raising 17,500 gallons of water every minute. The engine runs with extreme smoothness, making seven revolutions per minute. The cylinder is 110 inches in diameter, and the piston rod eighteen inches in diameter, with a ten foot stroke; the sweep rod is forty feet long. The boilers consume twenty-eight tons of coal every day.

The *American Engineer* gives a report of an interview with President Morton, in which he concurs in the general conclusion that the scheme to substitute electricity for steam as a motive power on the lines of the Manhattan Railway is perfectly feasible. He concludes: "Electricity is likely to take the place of steam power gradually, rather than with a boom, and many credulous electricians will be sadly disappointed. Mr. Edison says his best two assistants came from Stevens Institute, and we are keenly interested in electrical science here; but 10,000 mechanical engineers are wanted to every ten electricians, and it would be a mistake for a very great number of young men to determine to devote themselves to electrical enterprise. We may expect great things from electricity, but we must not expect them all to arrive in one day."

An immense locomotive has just been completed at the Sacramento shops of the Central Pacific Railroad. The total length of the engine and tender is 65 feet; it has five pairs of driving wheels, 4 feet 9 inches in diameter, with a 36 inch stroke; the weight of the engine is 73 tons, the weight on the drivers being 64 tons. The total weight of engine and tender is 100 tons. Between every two of the driving wheels is a double brake, carefully adjusted so that equal pressure will be brought to bear upon all the wheels at exactly the same time. The locomotive is known by the name of "El Gobernador," and is intended for the Techachipi Pass, in the Sierra Nevada Mountains, California; it is expected to do more work than two of the engines now used, with less consumption of fuel. The railway crossing the Techachipi Pass is a feat of extraordinary character in engineering. At a first glance, the mountain seems a formidable and almost unsurmountable barrier. It rises 3,000 feet in seven miles. The intricacies of the approach are utterly confusing at first sight, and it was necessary to make the line 25 miles long to overcome the height, even with an equated grade of 116 feet to the mile. The road at

one point is made to describe a spiral, so that it crossed over itself at a height of 97 feet above the lower tunnel. Such is the field of work of this giant locomotive."

The largest of the Harris-Corliss engines on exhibition at the New Orleans Exposition, from Providence, R. I., was started up on December 1. It runs a line of shafting the entire length of the Exposition building. This engine is a 30 by 72 inch, giving 750 horse power, and the line of shafting which it runs is about 1,400 feet in length. This was the first to start in the Exposition.

The Washington monument is protected from lightning by the following novel expedient. The apex of the monument, which is a conical block of aluminum of considerable size, has attached to its bottom part a heavy copper bolt which is at once divided into four parts, one of these being carried to each of the four heavy columns supporting the elevator. These in turn are connected with the well near the base of the monument, thus forming complete connection between its summit and the earth.

The present year has seen the building and equipment of the fastest, most powerfully armed, and most heavy armored war ship that has yet been constructed. This year has also seen the beginning of the end of armored ships. Ericsson's torpedo boat trials have demonstrated many things, and among others, the fact that a vessel may be sent to the bottom with a celerity and dispatch which make her armor only valuable as a sinker. High authorities abroad have expressed the opinion recently that, in the future, it would not be worth while to attempt to keep out anything except the balls from machine guns. When merchant steamers can make from twenty-one to twenty-two miles per hour, the vessels of war must not have a less rate of speed if any prizes are to be taken. If the armor is useless, an equal weight in the engine room would be a far better investment. If torpedoes or torpedo boats are to be generally used, the ship of the future must carry her armor over her whole hull if she is to be protected. It is even doubtful if the "Esmeralda's" twenty-one inches of armor would keep out one of the torpedoes used by Ericsson on his boat last summer. If these would not carry explosives enough to sink a ship, it is an easy thing to enlarge their capacity until they will do so.—*Industrial America*.

INDICATOR CARDS.

Evidently this column of our INDICATOR is in great demand. There are many cards which we wish to bulletin; but because they do not appear in this number, do not think that they have been forgotten. However, this card is aimed directly at the ubiquitous and self asserting "Preps," and indirectly, perhaps, at some one else.

We refer to the first term examination in descriptive geometry. The Sophomores *condescended* to occupy Prof. Morton's room—notwithstanding the fact that they were obliged to draw the figures with the paper on their knees—in order that the "Preps" might enjoy the luxury of Prof. Wood's room. This, to put it mildly, is a downright imposition. The undergraduates of a college surely have preference as regards the members of a little preparatory school. For the benefit of those who do not know our sentiments on the general subject of "Preps," we would state that we wish the authorities would keep the animals in their cage.

The class of '88 begins the year with a new list of officers, which we publish in another column. Editorially, we would like to give '88 a few words of advice. To begin with, '88, when you are gathered together in a class meeting, try and recollect that you are no longer "Preps," and behave with becoming dignity. Then again, '88, get a copy of Robert's Manual, and require your officers to post themselves on the more important rules for governing meetings. Encourage your presiding officer by remaining in order at all times. If you care to take the advice of those older than you, the business formerly transacted in fifteen minutes may be done in five.

At the beginning of the year it was announced that the tool room attendant would be on hand half an hour before the starting of the engine, and also half an hour after work was stopped. Now he is on hand according to the latter clause, but when one wishes to obtain his overalls at 1:45, he is not able to do so. For those who wish to make the most of their limited shop hours, this is extremely annoying. The student should be able to have his machine in readiness to start with the engine, and in order that this may be accomplished, it is necessary that he should receive his overalls in advance of this time. The rule is a good one, and THE INDICATOR takes it upon itself to urge that it be enforced.

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Exchanges, contributions, subscriptions, advertisements and all other communications by mail, should be addressed to THE STEVENS INDICATOR, Stevens Institute, Hoboken, N. J.

AFTER the publication of THE INDICATOR for December, the Board of Editors considered it expedient to prepare a report of the year's work ending with that number. The report presented was a complete statement, from the first number to the last, of the year's labors, and might be summed up somewhat briefly.

The business manager reported for his department the pleasing information that THE INDICATOR would be able to pay all claims against it up to date, and that a balance of some fifty dollars remained with which to begin the second year's work. This fifty dollars balance, it should be here stated, is not in convenient and available form; it is a balance nevertheless; but as it is largely made up of unpaid subscriptions, with every indication of their remaining

so, it may safely be entered in the profit and loss account.

These same *bad debt* accounts will be briefly foot-noted and kept for future editors to admire and shun.

Next presented was the general report of the year's run, including everything of interest and much that was not. Its principal points were as follows: From a business point of view, THE INDICATOR has succeeded quite up to the general expectation, having paid all its expenses and being left with a balance of *bad debts* for future speculation. As a paper, the Board was unanimous in voting the cover a success, the advertisements good, substantial and worthy of solicitation for the ensuing year. The literary matter furnished by the Board was commended and spoken highly of (by the Board), but the question was, where did it all originate!

The contributions from the students of the Institute were the subject of much heated discussion, in the vain endeavor to first prove that there had been any, and then the not less difficult task of finding them. Still they were found and presented, four in number, and read with considerable curiosity.

Four contributions from one hundred and seventy students for nine issues of THE INDICATOR!

The policy of the paper during the year has been of a varied character. In the beginning it had no policy, but one day Mr. Blaikie favored us with a most entertaining and instructive talk on physical culture. Well, it might it have been supposed that the very stones in the campus would have reared themselves into a gymnasium that same afternoon, such was the unbounded enthusiasm and grasping after the unattainable displayed. THE INDICATOR immediately took up the subject, and became eloquent in advocating the necessity of a gymnasium (it intends to continue so doing), and hoped in the course of time to rouse some interest among the students; it suggested plans feasible and otherwise, but of no avail. We are still watching and waiting

for the miraculous appearance of a well equipped gymnasium. But enough on this want of college feeling; we will speak of it in another editorial. The gymnasium *policy* failing, there was a relapse, and since then THE INDICATOR remained true to its first love and continued without a policy.

When it became time to publish the December INDICATOR, the editors themselves could scarcely get enough matter for the paper, as examinations required nearly all their extra minutes, and it was seen at once that an immediate and radical change was necessary in order to keep the paper alive.

The matter was brought before a meeting of the college and was finally settled by the organization of a company consisting of fifteen undergraduates, to whose care THE INDICATOR was given. Each of the fifteen are required to furnish at least one article for each issue of the paper or else forfeit their interest in it. In this way the work is more evenly divided than was the case with the old Board, and for this reason it should make each contributor's work more presentable. The paper will not be changed in any respect, the new management continuing the publication under its old form, beginning 1885 with Vol. II. The only change, and we hope that it will be soon, will be a general improvement of the pages between the advertisements.

IS there a lack of interest in college affairs among the students? To all appearances there undoubtedly is; and, if we had not thought seriously over the matter, we should arrive at this conclusion. It would seem a want of enthusiasm rather than a lack of interest. Occasionally this little fire of enthusiasm can be fanned into a glow, and, by persistent fanning, may even be kept up for several weeks, but it always dies down in the end. We are, of course, speaking now of the students in general; that is, taken as a whole. There are many who are willing to take even more than their share of responsibility; but, after herculean efforts, all the time calling for

aid, they are obliged to drop their load because most of the students prefer to see a burden carried rather than help to carry it themselves.

To support these remarks, let us look back upon some of the events of the past year. As a striking proof the subject of the gymnasium towers up before us. After Mr. Blakie's lecture last year much enthusiasm was aroused, and every one was ready to enter into the good work with zeal; it was merely a matter of how much time it would take to carry out the plans decided upon. A college meeting was held, a committee appointed and a subscription list started, which soon reached several hundred dollars. But, as soon as the majority of the students saw that the responsibility of the work had been laid upon a few, they immediately shifted all the work upon the shoulders of these few, thought of something else, and that is the last of it. Not that the subject has not been kept before the minds of all; the amount of sensible and valuable suggestions in THE INDICATOR would fill several pages of reading matter. It was discussed at some length in the *Eccentric* and was mentioned in the *Bolt*.

It is the same way in everything else; as soon as a committee has been appointed all the rest of the students drop all interest, or at least offer no more help, and after a time the project dies out, unless by heroic struggles on the part of the committee, the work is at last carried out. Let us give up this bad habit of selfishness and lack of patriotism. The college pin committee has not been supported as it should; the glee club will not be firmly established as a permanent feature unless all put their shoulders to the wheel and work with a vim. Come, let us be up and doing. Do not say that you cannot help because you do not know whom to ask about it; take the initiative yourselves. Let there be a friendly rivalry as to who will do the most; think not of the honor that is due to you for your work, but remember that it is for the honor of Stevens that you are working.

COMMUNICATIONS.

To the Editors of The Indicator:

Not long ago I had occasion to perform some experiments with a galvanometer, in which a mirrored needle throws a beam of reflected light upon a transparent scale in front of the instrument. In order to test the sensitiveness of the galvanometer, I placed the wires connected with the coil upon my tongue. The spot of light was immediately thrown off the scale. Placing one wire above my tongue and the other below it, the spot of light disappeared to the right. Changing the position of the wires, and placing the one that was above before below, and *vice versa*, the spot disappeared to the left.

Wishing to further carry out this experiment, I placed the wires one on either side of my tongue, and then put them through the former process. The current was reversed in this case also. There was no battery in any way connected with the instrument.

Can any of your readers state the reason for this occurrence? I do not think that it can be due to polarity; and as the wires were both of copper, I can think of no explanation.

FRESHMAN.

To the Editors of The Indicator:

What a profound knowledge of human nature is shown in the mass of fable literature which has been produced in past ages! In the every day walks of life do we continually see where some of these productions might most truthfully be applied. Quite recently, at the Institute, have we had brought to our notice a case to which would be most applicable the fable of a "Mountain which went to labor and brought forth a mouse." We speak of the proceedings of that august body, the college pin committee.

This committee, an assemblage of mighty intellects, culled by the infinite wisdom of the class presidents from their respective bodies, after duly organizing and framing as comprehensive a set of by-laws as would be adequate for a country debating society, set to work on their arduous and difficult task. Knowing, as they did, that the subject was one entirely too deep to be coped with by the ordinary intelligence of professional designers, they set their gigantic intellects to create something new and original.

Patiently did the members of this com-

mittee toil on, steadily they consumed the boarding house gas, until finally, a few days before the Christmas holidays, they brought forth their sublime effort. This, with due ceremony, was unveiled at the bulletin board to the admiring gaze of a number of infantile freshmen.

Brilliant with all the colors of the rainbow, with the contour and dimensions of a full grown sunflower, decorated with letters fitted to adorn a circus poster, such was pinned, this the essence of the artistic conceptions of the entire body.

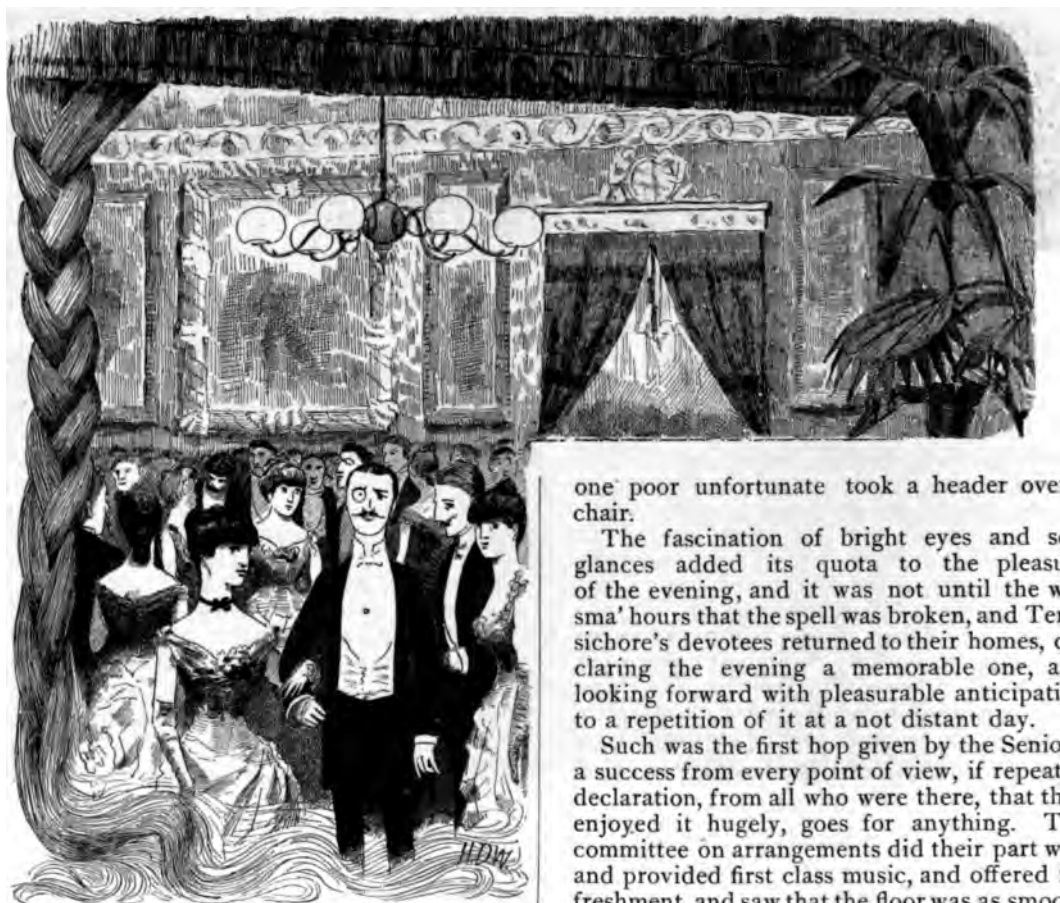
Whether it was owing to the lack of artistic feeling among the students, or whether their ideas were not educated sufficiently to appreciate this æstheticism, at any rate the college, as a whole, failed to agree with the committee, in that this was the best that could be done.

The committee have accordingly again withdrawn themselves from the world, and in the seclusion of their apartments strive to solve their refractory problem. Of late their meetings have been frequent; solemn have been their countenances. Whether this bodes good or evil no one can tell; and until we know, the whole college must remain in suspense, waiting for the next inspiration of our committee of shining lights.

RX.

GOOD ADVICE.

President Porter, of Yale, once gave this sound and wholesome advice to the students: "Young men, you are the architects of your own fortunes; rely on your own strength of body and soul. Take for your standard self reliance. Inscribe on your banner, 'Luck is a fool, pluck is a hero.' Don't take too much advice; keep at the helm and steer your own ship, and remember that the art of commanding is to take a fair share of the work. Think well of yourself. Strike out. Assume your own position. Put potatoes in a cart, go over a rough road and the small ones go to the bottom. Rise above the envious and jealous. Fire above the mark you intend to hit. Energy, invincible determination, with a right motive, are the levers that move the world. Don't swear. Don't deceive. Don't read novels. Don't marry until you can support a wife. Be civil. Read the papers. Advertise your business. Make money and do good with it. Love your God and fellow men. Love truth and virtue. Love your country and obey its laws."



On Wednesday evening last, Terpsichore smiled benignly upon her votaries as they hurried about nine o'clock to pay their homage at her shrine, and the services and rites of worship were long, and under the fair muse's inspiration, faces beamed with pleasure and fair forms and manly figures glided to and fro in unison with the dulcet strains of harmonious music.

Never had the goddess received more ardent worship, and in answer to the invocation, she was lavish of her favors, and taught all to feel the poetry of motion as they had never felt it before. Even the couple that never had waltzed before, after a time ceased their irregular spasmodic hop, ceased making others wish they had been in foot ball training, and sat down. Under the irresistible impulse of the music, couples were compelled to move in curves of beauty and rhythmical unison, except when the floor proved too slippery, and

one poor unfortunate took a header over a chair.

The fascination of bright eyes and soft glances added its quota to the pleasure of the evening, and it was not until the wee sma' hours that the spell was broken, and Terpsichore's devotees returned to their homes, declaring the evening a memorable one, and looking forward with pleasurable anticipation to a repetition of it at a not distant day.

Such was the first hop given by the Seniors, a success from every point of view, if repeated declaration, from all who were there, that they enjoyed it hugely, goes for anything. The committee on arrangements did their part well and provided first class music, and offered refreshment, and saw that the floor was as smooth and slippery as wax could make it.

The order of dancing was well arranged and well adhered to, and everybody danced with great zest and untiring ardor until, judging by the limp condition of shirt fronts and high collars, it was about time to desist.

There were about five sets, and some of Hoboken's most charming young ladies and one fair one from out of town graced the hall with their presence. Among the costumes was one of jasmine yellow, surah silk combined with satin of the same shade and edged with valenciennes lace. The bodice was made close fitting and of wine colored brocade, and a cluster of light roses was worn against the square cut corsage, filled in with Venetian lace; altogether the very *acme de la mode*. A large number of the students were in evening dress and the appearance of the hall was very pretty.

Some Hobokenites were credited with saying that the affair could not be a success without their co-operation; but the success of the

first of the series of hops proves that the students can be entirely independent, if they only continue to exercise as much good taste and judgment in the future as when they started, and especially if they have the sympathy of the majority of the students of the college.

PERSONALS.

'76.

E. B. WALL, superintendent of motive power on the Pan Handle route, at Columbus, Ohio, is having conducted under his supervision an exhaustive investigation on the great question of the consumption and economy of fuel in locomotives.

'78.

OSCAR ANTZ is foreman of the South Amboy shops of the P. R.R., at South Amboy, N. J.

'83.

JOHN ADGER has given up his position as manager and treasurer of the Charleston Iron Works, and is now in the steamship office of James Adger & Co.

FREDERICK C. FRAENTZEL is with the Celluloid Manufacturing Co., Newark, N. J.

'84.

EDWARD B. RENWICK, in the Brooks Locomotive Works, Dunkirk, N. Y., has charge of a night school for the apprentices of the works, held three evenings of each week.

S. I. T. GLEE CLUB.

We now have a regular organized college glee club. There are at present eighteen active members: four from '85, four from '86, five from '87, and five from '88. The club held a meeting for organization a few weeks ago, and adopted a constitution, with Mr. Cotiart, '86, as president and director, and Mr. Burhorn, '85, as secretary. Mr. W. S. Dilworth, '85, has kindly accepted the office of business manager for the club, and will have entire management of its finances. Mr. J. S. Camp, of Wesleyan, has been engaged as

musical director and leader. Regular meetings and rehearsals are now held two afternoons of the week and Saturday morning, and it promises to be a complete success. Already arrangements are being made to give a concert in March, which promises to be an affair both interesting and worthy of Stevens. It is necessary that the glee club should receive the entire support of the college; and as there is no doubt but that the concert will be successful as a musical performance, in order that it may be a financial success, we urge upon the students that it is their duty to give it their financial support. It is desired that each man subscribe at least one dollar, for which he will receive in return two fifty cent tickets for the concert. Those subscribing two dollars will receive five tickets, and in like proportion. It is to be hoped that the glee club will prove a permanent feature. Upon the success of this first appearance depends the future success of so desirable an institution as the S. I. T. Glee Club.

THE INDICATOR PUBLISHING CO.

The support given to THE INDICATOR by the students of the Institute during the year was particularly conspicuous, owing to its absence; and as matters grew worse, the editors decided that some decisive action was necessary on their part to prevent the paper from failing completely. At their last regular meeting, held early in January, the greater part of the time was taken up in discussing the propriety of the board resigning. The final conclusion reached was, that as representatives of the students, they had not only taken charge of the publication of the paper, but had furnished all the articles; consequently, doing the work of the board and the students combined.

The board further considered that their obligations to persevere in drumming up the latent energy of the students no longer bound them; for besides wasting their valuable time, the constitution revealed the fact that the paper was published by the students, and as it had without exception been published for them by the editors, the latter showed their prompt appreciation of this fact by resigning. Thus it was decided to hand the paper over to the students, and by resigning give some one else an opportunity to dig for contributions. This resulted in the calling of a college meeting to consider the advisability of continuing the publication of the paper.

The students were generally unwilling to see the enterprise fail, and resolutions were passed to the effect that THE INDICATOR should be continued as the college paper. The matter was finally left in the hands of a committee of eight, with instructions to organize a company to assume entire charge of THE INDICATOR and present their report to the college for acceptance. The committee immediately set to work, and submitted a lengthy report, from which the following essential points are noted :

"The committee, in accordance with the authority delegated to them at the meeting held on Thursday, January 8, organized a stock company for the purpose of publishing THE STEVENS INDICATOR, and have adopted a constitution and by-laws for the same, which provides as follows: The name of this organization shall be THE INDICATOR Publishing Company; the membership shall consist of fifteen stock holders, each of whom shall be a subscriber to one share in the stock of the company. Vacancies in the company shall be filled by a two thirds vote of the stock holders; only undergraduate members of the Institute shall be eligible to membership in the company; *members shall be required* to contribute at least one satisfactory article for publication in each issue of the paper, which article shall be subject to the approval of the board of editors; failure to comply with the above shall subject a member to expulsion by a two thirds vote of the stock holders, provided he offers no excuse satisfactory to a majority of said stock holders.

(Signed.) R. H. RICE, *Chairman.*"

This report was accepted, and the committee, as a nucleus of the company, were given entire control of THE INDICATOR.

Immediately after the college meeting adjourned the committee proceeded to complete the organization of the new company. Fifteen members were elected, and from these fifteen, seven were chosen editors for THE INDICATOR. The company as organized consists of the following members: Class of '85, Glasgow, Rice, Rusby, Williams; class of '86, Birdsall, Collins, Fuchs, Morrison, Mowton; class of '87, Bayles, Moeller, Schlesinger, Smith; class of '88, Fuller, Wynkoop. The officers of the company are: Pres., Collins, '86; Vice Pres., Rice, '85; Sec., Smith, '87; Treas., Birdsall, '86.

The board of editors are: Editor in chief, Collins, '86; business manager, Birdsall, '86; exchange editor, Morrison, '86; associate editors, Rusby, '85, Fuchs, '86, Smith, '87, Wynkoop, '88.

ATHLETICS.

MEETING OF THE ATHLETIC ASSOCIATION.

The meeting of the Athletic Association held on the 14th inst., was a busy one. Other matters the gymnasium received attention, and active measures were taken to advance the matter, a committee being appointed to determine the course of action to be pursued in establishing a gymnasium. The students are evidently determined to secure a building in some way, and will rest until their object is accomplished.

A proposition from the Arlington Base Ball Club to lease the grounds two days each week was received, and the matter placed in the hands of the directors.

It was also decided to assess each member twenty-five cents to meet the debts of the association.

The committee having control of the affairs of the base ball league are reminded of the fact that no pennant has as yet been presented to the Lafayette College Club.

STUFFING BOX.

Skating on the meadows.

Will nitrate of silver turn yaller d black?

Popular song in '86 class room: "I Dure."

The Juniors get sat upon on an average twice a week.

The Seniors are enjoying rifle practice in the Physical Lab.

'85, it is said, will soon have one member go to Canada.

Sealed proposals will be received for a new steel door for '86 class room.

Graydon & Denton have a contract for a new aqueduct for New York.

The pleasures of the Chem. Lab. are wholly *unalloyed*. (Diagram next morning.)

Lynching will speedily follow the posting of the boarding house notices on *our* bulletin board.

Freshman at Hoboken P. O. : " Please give me twenty-five cents' worth of two cent stamps.

The death of Chem. Lab. Imp No. 3 is daily expected ; several have vowed to murder him.

Fog horns will soon be necessary in order to navigate successfully in the Chem. Lab. after 3 p. m.

It is given out as a private "tip " that W-ll-m St-v-ns, '85, is engaged. "One more unfortunate," etc.

Upon taking up Worcester the other day, the first word we saw was "LOVER," and after it "see LUNATIC."

One of the Freshies wants to know if he can't buy his triangles numbered, so that he can tell the 45° from the 60°.

We heard the other day of an Irishman who joined the Seventy-fifth Regiment during the war so as to be near his brother, who was in the Seventy-fourth.

Yea, verily, great and unanimous was the kick when the notice was posted informing the Juniors that amusement would be furnished in the shop on Saturdays.

Prof. in Physics—Therefore, you see manifestly, that if, er—a man went near enough to a cannon, he would not hear the report until after the ball struck him ! "

We think our little Senior's cane must be hollow and filled with cough(ee) mixture, as he constantly appears to be drawing something therefrom into his mouth.

A small friend of ours, forgetting the name of the father of wickedness, asked his mother : "Mamma, what's the name of the gentleman who keeps the big fire place ?"

We note the failure of another millionaire in the daily press. It was not stocks ; oh, no ! His son merely bought the reference books mentioned by his Prof. at college.

It was in the country, and they were talking about the pastor, who had a bad habit of talking through his nose. "I guess," said one, "that he does that to rest his throat."

New Year's Day appears to have been easy on the students and those who direct their minds and actions. It may also be stated that no stones fell off the roof on that day.

What the chemical laboratory needs is an exhaust fan run by power from the shop, as

there is generally shop work going on, on Lab. days. At present *aqua regia* holds the fort.

We have but recently discovered that one of the students fills a public office; he is a tacks collector. If he wishes to die a natural death with his boots off, let him beware of attacks.

Prof. to student : "How does a belt act—by a push or a pull ?"

Student C—: "Yes, sir, it pushes on one side and pulls on the other." (Prof. paralyzed.)

Student (to Prof. who was stating a point for the thirtieth time)—Professor, you have told us that twenty-nine times already.

Prof.—True, very true! but there are thirty students in the class.

Now is the time when the unwary student weareth no overcoat to college in the balmy morning, but before night the blizzard cometh hence from Manitoba, and knocketh him out so that he is absent the next day.

Our laboratorious Juniors remind one of a matron blessed with daughters. For, whenever any obnoxious fumes are perceived escaping from a seemingly innocent beaker, they shriek: "Put it under the hood!"

Why don't the enterprising Hoboken landlady, instead of eclipsing all college notices on the bulletin board, take advantage of THE INDICATOR and advertise, thus reaching even the student who enters and leaves the building by the basement ?

A few years from now, when a member of '99 wishes to sell his Kinematics to a member of '00, he will insist on the value of the book viewed in the light of an autograph album of distinguished men, in addition to the probable good condition of the book itself.

Problem in Mechanics : Given a man making his exit from a *Salon d'Esprit*, after a sojourn of as-long-as-the-money-lasts minutes. To find the conditions of stable equilibrium, also possible influence of external forces (police force, etc.) Ans. $\forall \text{ pseudos}$.

Inasmuch as the selection of a college pin is at present under consideration, and since it seems to be expected that every one should propose a design, we desire to state that, in our humble opinion, the simplest, most appropriate and most suggestive ornament would be—a crank-pin.

Mr. Koenig (in German, after some hesita-

tion): "When the working-set-in-motion-left-to-itself force, A B, then the w-s-i-m-l-t-i force meets stopped have been will," etc. (sighs deeply).

Prof. K.: "Mr. K., does that really satisfy your cravings after truth?"

For a truss for light and quick work, those at the Manhattan Roller Rink, at Fifty-ninth Street and Eighth Avenue, New York, are worth seeing. The floor is also one of the finest of the kind in the city, and the management not only perfect, but the floor is always free from the "tough" crowd that infest most other rinks.

Another subject has entered the lists for torturing the Juniors—it is Kinematics. The *repulsion* which it met last year showed itself lately by the readiness with which the Seniors sold the book at fifty per cent. off. Some say that the K. is derived from the German *Keine, matt, etc.*, but we claim that is derived from Prof. MacCord.

We note with feelings which we can scarcely express in language fit to be printed, that our hirsute friend in '85 has at last heeded the loud and sometimes profane requests to shave off the "loose chewing" which adorned (?) his phiz, as the class had vowed not to allow him to graduate with the hairy necktie. We suppose this hastened the daring act.

Jones was speaking of Brown to his partner some time ago, and said that, although Brown was a jolly fellow, he, like others, had his failings. "I am pained to be compelled to speak thus of him," said he, "for I like him, but, unfortunately, I love the truth still better." "Why," said his partner, "I never thought that you preferred a perfect stranger to an old acquaintance."

The question of the College Pin seems to be a hard one to settle; at the last meeting it was decided to get a fresh lot of designs to choose from. This is a wise move, as the best of those on the bulletin board resemble too closely the National Guard pins. What we want is something distinctive, *plain*, and not so expensive as to be only purchased by a few of the men. It should be also small as well as plain, or it would never be worn after graduation.

The Editorial Boards of the *Eccentric* and *Bolt* are both hard at work on their respective annuals. The struggle for first place has changed the appearance of our annual publications greatly in the last few years; from almost mere pamphlets they have grown to full

fledged books, worthy of preservation. Let us hope that this year's production will throw all previous efforts in the shade, but, above all, let them be clean, and not show any contact with Mother Earth.

Ben Franklin has had a hard time of it lately. After knocking the defenceless old man down, he was transferred to the Stink Zimmer of the Chemical Laboratory, and decorated with a Tam O'Shanter, "Excelsior," and a checked jumper, while a number of artistic members of the class, with charcoal and red lead, endeavored with more zeal than success to beautify the countenance of the illustrious Ben. The next day the Professor ordered a bath for Ben, which was the cause of his subsequent non appearance at his usual post in the Library. In fact, he has been ill ever since and had to be (literally) laid on the shelf.

The officers of the class of '88, for the remainder of the collegiate year, were elected amid much confusion and uproar at two recent meetings of the class. The elections resulted as follows:

President, Whigham.

Vice-President, McLean.

Secretary, Phipps.

Treasurer, Echeveria.

Historian, Hall.

Chaplain, W. B. Smith Whaley, D. D.

Mr. Echeveria had performed the duties of Treasurer in such a highly satisfactory manner that he was unanimously re-elected to that office.

For the benefit of those reciting on "Materials of Engineering," we publish the following as a mathamatically correct conclusion from the statement of Professor Thurston, that; "The factor of Safety is a factor of Ignorance, hence we have

Factor of Safety = Factor of Ignorance.

∴ Safety = Ignorance,

hence Safe = Ignorant.

∴ A safe man in Materials of Engineering = an ignorant man in M. of E. But a man safe in M. of E. = a man safe to pass in M. of E.

Axiom: two things equal to the same thing are equal to each other.

∴ A student ignorant in Materials of Engineering is safe to pass in it.

We heard recently of two embryo mechanical engineers, residing not a thousand miles from Hoboken, who were spending their vaca-

tion in a Jersey town last summer, in which lived a Miss G——, on whom they used to call alternately. One evening as Ed. C., the apparently less favored one, was wrestling with the problem of keeping up the conversation, he suddenly said, in dulcet tones: "Do you think, Maud, that you could leave your fond and indulgent parents, your circle of admiring friends, a home where every wish is gratified, where all is ease and luxury—could you leave the place of your birth, a town with a roller skating rink on every block—could you abandon all these and go to the far West with a poor but honest mechanical engineer, and with him face the hardships and troubles of life, and grow up with the country, and be his support and try to make his burdens lighter?" Stealing her arm around him, and laying her head on his shoulder, she faintly whispered, "Yes."

"Well," said he, moving away suddenly, "my chum, George A——, is going West next week, and I'll just mention the matter to him, as he wants a wife."

EXCHANGES.

We regret very much to be obliged to apologize for the loose way in which our Exchange department has been carried on for the past few months. We shall be sorry indeed to lose any of our exchanges through that negligence, and we hope under the present management of THE INDICATOR that the department will be faithful to its duties in every respect and fulfil all its requirements as it should. So many exchanges are now on hand which have not even been acknowledged, that it will be impossible to attend to all in the present issue.

The *Electrical Engineer* begins the year much enlarged and improved. It opens with a short review of the progress of the science during the past year, and passing on gives an article on the prospects of the electric railway. The opinions of some of the authorities seem to show that such railways are feasible. An interview with Henry Morton, of Stevens, occupies quite a space. The interview closes with, "I do not see any reason to believe that the change can advantageously be made. The difficulties to be overcome are numerous, and some of them of a very serious character. I doubt if the change will be made for many years to come."

Mr. Edison, however, considers "The economy of electric locomotion settled, and that its immediate application is simply a question of proving it to the satisfaction of the management."

Mr. Weston argues that in light running machinery electricity is a safer, more convenient and more economical agent than steam; that the small steam engines now in use are too expensive, and not altogether safe. It contains many other articles of importance.

Van Nostrand's Engineering Magazine for December, opens with "Theory of the Sliding Friction of Rotation," by R. H. Thurston, of Stevens. It treats of the subject in its various conditions, using calculus and analytical freely. A description of "The Manufacture of Crucible Cast Steel" is elaborate. Beginning with the old fashioned method of converting bar iron into steel, and afterward melting it in clay pots to form ingots of cast steel, it traces the history of its manufacture to the methods now in use. The whole article is exceedingly interesting and gives one a very good idea of steel, its manufacture and properties. The other articles are as worthy of attention.

Mechanics for January contains a machine for "Measurements of Friction of Lubricating Oils." Its operation is based on the principle of measuring the friction between two annular plates, and the whole designed for the purpose of observing these with precision. The methods of using, as well as tables and curves showing results, are given in detail. An article on "Continuous Air Brakes" is worthy of notice as interesting. The illustrations of the Humphrey turbine water wheel are excellent, as are all the other drawings.

The *University Herald* speaks of the protests against the marking system now in vogue in the colleges. We should like to add our voice to the many entering such protests. We have long been of the opinion that our marking system cannot do entire justice, and have been gradually arriving at the belief that our so called *marks* mean nothing whatever. It is true in some departments we are satisfied, and that because we know the *marks* are more of the nature of daily records than a simple number representing what we are supposed to know. We could give many examples of the injustice done many of us, but no need; they are too well known to bear repeating. We are glad we are not the only ones who are eager to have the system done away with.

One of our London exchanges, the *Amateur Mechanics*, contains an article by R. H. Thurston, of Stevens, on lubricants. The magazine is a very interesting one, and much more technical than its name would seem to indicate.

The *Tech* has a short but sensible editorial on parliamentary practice at the Institute. We would do well to follow out some such plan as has been suggested by our sister institute. The next number contains an editorial upon the abolishment of quantitative analysis at Columbia School of Mines. The argument is ably carried out.

Once more we are reminded, this time by a description of the Pratt gymnasium, in the *Amherst Student*, of that handsome building standing (?) in the corner of the campus. We call it our gymnasium and library. And do you ask, as you look toward that much frequented spot, where is that building? We can simply answer—Where?

We feel sorry for the *Chronicle*. Its gaudy cover haunts us. Once when we did venture to go beyond the cover, and gaze on the inside, we found the literary character of the paper good. O that our exchange would adopt a modest cover. Not show, but merit.

We would like to hear again from the pen that wrote "Meditation of a Hindoo Sceptic," in the *Queen's College Journal*, and we should like to inform our exchange that we are not "St. Stephen's Indicator, Holboken, N. J."

We acknowledge the following recently received exchanges: *The American Engineer*, *Yale Record*, *The Tech*, *The "84," Lafayette College Journal*, *The Michigan Argonaut*, *Amherst Student*, *Bowdoin Orient*, *The North Western*, *The Sibyl*, *The University Herald*, *Queen's College Journal*, *Weekly University Courier*, *Hudson County Democrat Advertiser*, *The Holcad*.

CHIPPINGS.

At the polo grounds—Princeton Freshman with a gaudy orange and black striped handkerchief tied over the crown of his hat, circulating freely. Happy member of a stock brokers' party: "Put some paris green on that potato bug."—*Yale Record*.

"I think your moustache is lovely, Mr. Smith, and I only wish I had it on my face," she said, as she gazed into his face with a sort of gone look. And the infernal old dolt didn't catch, but only remarked that he thought it was very good for a three months' growth.—*Northwestern*.

Co-ed—"Yes; I am learning crockery painting; it is all the rage."

Male Student: "Yes; it seems to be. Do you paint anything besides your mug?" And now she only considers him as a brother.—*Campus*.

Sophomore (putting up Freshman)—"Give three cheers for '87."

Fresh—"Three cheers for '87! Rah! Rah! Rah!"

Soph—"Say, '88 is no good."

Fresh—" '88 is no good, but (sotto voce) Lord help '89."—*Concordiensis*.

We were standing by the gate,
And although 'twas only eight,
She had told me that she
Could no longer stay;
Yet I would not then depart,
But still clasped her to my heart
And besought her that she
Would not go away.

So I held her little hand
And continued yet to stand,
Though I saw that she began
To nervous grow;
But I felt a little pained
When she suddenly exclaimed:
"Here's my other fellow coming!
You MUST go."

—*Orient*.

"Hoboken is the Williamsburg of New Jersey; Williamsburg is the Hoboken of Long Island. These are the divine geographical parallels of an insular metropolis. America, I salute you. This is only a thought. All the same, I had rather be to windward of Hunter's Point."—*Extract from ancient writing*.

A health journal says: "Too thick underclothing causes unnatural redness in the face and nose." We never heard it called that name before. Perhaps if the editor of the health journal was to dilute his "underclothing" with a little water before swallowing it, the unnatural color would not manifest itself so prominently.—*Ex*. When we think of this statement and then recollect that the weather lately has been very cold, we are able to see the connection between o. w. janitor and the falling of stones from the roof.

* THE *

Stevens Indicator

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* February, 1885. *

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Vol. 2.

HOBOKEN, N. J., FEBRUARY, 1885.

No. 2.

AN ADDRESS TO OUR CAT.

[Suggested by, and written during, an unpleasantness occurring under the writer's window, and punctuated with short naps and nightmares snatched with difficulty between the acts.]

O whiskered watcher in the dismal dark,
That, when tired mankind slumbers, still doth keep
Untiring vigil that no danger come,
Nor likewise any jarring noise to break
His sweet repose; with joy mine ear doth greet
Thy plaintive warble, marvellous combination
Of pluck and playfulness, of lightning sinew,
And claws, and teeth, and unground sausage meat,
And energy condensed; who in the sun-light
Dost chase for hours in ever varying orbit
Thy fleeting tail; anon, when hunger gnawest,
Followest the chase, and soon thy dainty palate
Dost tickle with the toothsome rat; and when
The rash bull pup thy province doth invade,
Seekest the field and with unerring aim
Dost rake out pelt and optics; faithful friend,
That, in the ghastly hours of darkest night
Comest to soothe me into slumber sweet,
With gentle lullaby; thy kindness maketh me weep;
But don't distress thyself on my account,
I'll manage to pull through without the music;
So seek thy couch and slumber until daylight,
Feline canary.

[She doesn't slumber to any appreciable extent. A smothered snuffle is heard.]

What, sneezing, Tabby? From that direful omen,
I fear that thou'rt contracting influenza
Out in the chilly night air; or, perchance,
Some waddering hayseed hath itself ensconced
Within thy nostril.

[The ball opens in earnest. A chorus of yowls is heard, mingled with a rippling sound and the whiz of flying fur.]

Alack! I must infer from this rude clamor
That thou hast entered on the field of battle.
Well, sail in Tabby! make of tooth and toe-nail
Most righteous use, and that my frail tympanum
Remain intact, I'll gently plug my ears up,
Until the fray is o'er, and noise of battle
Hath died away.

[The fight is finished. The bard speculates on the extent of the damages.]

thankful am I that the racket's ended;
little hurricane again subsided,
I am left once more to sleep in quiet.
Was a lively set-to! ah, poor Tabby,

I much do fear that in this little pic-nic,
Wherein for glory ye do rashly barter
The warmest friendship, also divers portions
Of your anatomy, that thou hast gotten
A fatal wound, or that thou hast e'en suffered
Complete disintegration; but whatever
Hast been thy fate—whether a gory victor,
Or scattered o'er the field in shapeless fragments,
Until the daylight endeth all conjectures,
Good night, sweet songster.

LIBERALITY OF THOUGHT.

Among the minds with which we are brought into contact, the one which attracts us the most, is the one which is liberal and well balanced. The mind which, though great in a single field, is incapable of looking outside of it, is not the one to court companionship, unless of unusual ability in its own pursuit, and even then draws but few to itself, and is comparatively isolated. Not only is intercourse with them unsought, but is it not to the majority even disagreeable? Although it is force of circumstances which sometimes confines a person's mind to one thing and prevents it from expanding, still this is not generally the case; but a person who follows one line of thought, looking upon and capable of appreciating nothing else, is regarded as possessing a narrowness which is repulsive to those whom he may meet. All who are not attracted to him by identity of occupation, feel that he is not only not a co-worker, but that he is unsympathetic, and such a quality renders him exceedingly uncongenial.

It may be truthfully urged that progress in any one branch demands the concentration of thought upon it, and that improvements are always due to those who do this.

This is readily admitted, but the concentration of thought should not be at the expense of all interested in outside things. There is a happy mean between the making of an efficient human machine, and the making of a dabbler in all things who does good work nowhere. There is, it seems, at the present time a special tendency toward the produc-

tion of persons of one idea, and is not this largely due to the inordinate desire of the present generation to become exceedingly wealthy?

No young man of the present generation is content to think of making a comfortable living, but his one dream is wealth, and his one effort to get as much of it and get it as soon as possible. He applies himself diligently in his particular pursuit, shuts his eyes to all outside, too often totally neglects all cultivation of mind, becomes a person of one idea, and eventually may be a genuine "crank."

There is some cause for asking whether we are not becoming in some respects too practical. A prominent writer has recently expressed himself to this effect, and alludes to our civilization as a "commercial" one. There is too much of a tendency to expend all our thought in money-making, and there is somewhat of a tendency, we think, to despise that which is not of use in effecting this end. This is certainly a mistake. Life does not mean simply the building of railroads, the perfecting of steam engines, or the improvement of manufactures; these are simply means of providing for the comfort and happiness of mankind, and although they are of the highest importance, still, we should not forget other things, which, while having no part in the supplying of our everyday needs, are productive of pleasure through the mind, and are just as worthy of consideration as our practical operations.

WHEN I FIRST CAME TO STEVENS.

II.

Visiting Stevens the second time, I noticed the sign, "ring twice." Obliging as I am, I "rang twice," as hard as possible, and stepped in through the massive door. It was just election time, and the excitement ran high. Bets were being made on the issue of the campaign with a recklessness which flavored of the insane. (I have, however, not been able to ascertain as yet whether any one lost or won.) I hastened my footsteps, till I passed through the foggy atmosphere of the pool-room, *alias* library; then I entered the workshop. It was on a Friday; that is a day on which there is no shopwork, as you know, probably (as I thought) because Professor L— is a Mohammedan—L—a (Allah) be praised! I was thus at liberty to imbibe the delicious odor of machine oil without the

sweet admixture of steam, iron filings, and wood turnings. At the far end of the shop I espied a pitch-black, formless mass as big as your fist, which on minuter examination I found to be some *waste*, the only sample of the kind in the whole shop. That, other things being considered, the workshop is perfect in every respect to be mentioned. One sad recollection, however, damped my admiration; I knew that this room had formerly been the gymnasium, and that the latter has entirely disappeared to make room for a college institution.

Slowly I ascended the broad staircase, and dropped in at one of the class-rooms. In the door right under the knob was a "sad relic of the departed" lock. Hats and coats alone were there, turning sad, melancholy glances on the divers cast about rather fragments of chairs, promiscuously grouped around in every position but the right. Another class-room, which I attempted to enter, was locked! yes, yes! A gruff voice howled out from the interior, "exceedingly polite remark of 'Come in'! But I did not go in *for spite*!"

Excelsior! one more flight (*i. e.*, one more) and I am in the drawing-rooms, not the parlors where people draw on the kitchen, but drawing-rooms where people draw on paper. How beautiful! Fine sketches of graceful curves and of architectural sections looking out of frames of antique simplicity break the glaring monotony of the walls. At various places T-squares hang open, while others may be found hidden away in obscure corners so as to lead "borrowers" into temptation. Tables strongly resembling those depicted by Dutch and Flemish masters, crowded together, covered they are, but not with huge oil-cloth, as might be expected; an extensive paper table cloth veils the thumb to fasten the white paper beneath. In the corners there the table cloths (or rather table covers) are ornamented with a sketch resembling some wild animal, or perhaps a piece of art; these covers are also fastened instead of autograph albums for paying compliments (?) to some one, instead of wipers, and at times for some unknown purpose merely indicated by a missing corner. I would advise some speculative mind to employ a janitor, to hire out these tables for academic purposes, say posting boarding-house paper articles about ivory soap (!) and the pectuses of the Eccentric *Bolt* and the Eccentric. Suddenly a noise burst

stillness of the place. Occasional inarticulate howls alternated with distinguishable yells of "pope" and "S-t-e-"; the sounds were evidently issuing from the room at the other end of the floor. I rushed thither to see who was being hurt, but on opening the door, I realized the whole situation. Juniors were singing! I thought then that it was getting too dangerous, especially since I saw the professor also rush in, undoubtedly to listen to the harmonious strain. You have heard, of course, of the power which music has of drawing animals out from their recesses. It drove me away. I hurried across the room toward what was, as I am willing to bet with anybody, a door; but still it would not open. I had to turn back. In my excitement I almost upset one of the Juniors, who sent after me, beside his well-trained foot (he was no mule, but a football player), a volley of of-f-f—those benedictions so characteristic of the Stevens man.

Down the stairs I came like the stick from a sky rocket, and struck hard against an infernal machine placed there to—Well! what could it be? Electric wires connected, it may be, with some hidden dynamitar; the complicated works were visible, and—since it did not go off, according to my expectations—I did! The first thing which I perceived that was worthy of closer attention was Prof. Thurston's lecture-room. In I went with my usual unconcernedness, in order to examine more closely the place, so oft resounding with the words of that celebrated gentleman. About two-score chairs were there, each provided with a broad attachment at the right side, probably used directly for an elbow rest, and indirectly for a support to the "gently nodding" head. A multitude of scientific papers were strewn all over the floor, and reminded me of the "battle of the books," which might be revised and named the "paper battle," to make it more general. I have no doubt but that these are beneficial in assisting to keep the students wide awake. Thousands of pictures adorn the four walls, while millions of models of all sizes are put up in glass cases all around the room, very likely in order to protect them from the fragments of chalk which find their way in some mysterious manner through the air to the floor.

After looking around and examining the complicated engines till my head began to buzz in unison with the—but they were not in motion; I had merely been "dizzied" by looking steadfastly at them, to unravel the

connections. My legs soon caught the contagion, and also moved off, leaving me behind (in my mind)! A FRESH MAN.

INVENTIVE GENIUS.

Perhaps there are but few students of mechanical engineering who have not at some period of their career had a fit for inventing. Probably in the great majority of cases it was our little puttering with tools that was the ultimate cause of our being students at Stevens. We had our little workshop, which always had that attraction, which made us bestow upon it many of our spare moments and much of our pocket money. But even before we were old enough to handle a tool, except an old jack-knife for which we swapped a top and three China teapot agates, our imaginations were at work devising some mechanical apparatus for our amusement.

What fun to begin to lay "imaginary quantities" of water mains out in the back yard, and before the trench is a foot deep, we have rigged a tripod derrick out of three clothes poles, some pulleys, the clothes line and a water pail (the one used for drinking water, of course; we couldn't find any other). How we tugged and hoisted, showing our playmates how far we had to pull the rope to hoist the pail half the distance; how the ropes got twisted and ran off the pulleys, and at last—snap goes the rope—dumping a whole pail of dirt on our little brother who is digging down below. Now we fill a tub with water, carrying it to the second story, slopping it all over the stairs and wall-paper, and then making a siphon of a piece of old hose, we are ready for our squirt. We try to start the flow by sucking at the lower end, we think the water is not coming, and are just about making a second attempt when—spurt—out comes the water, completely drenching us. Thus early we begin with our inventing and experimenting. Later comes the rigging of some old clock works to a boat, railroad train or continuous ringing of some bell which we start in the middle of the night by "pulling the string." One day the clock stops. "Pa, le' me fix it." "What, you, Charlie?" "Yes, I bet yer I can fix it." Well, so he lets you try, and after much monkeying, lo and behold! it actually goes all right. Supreme moment of happiness, your destiny is settled from that hour. And so, beginning with a few old tools, we pass through the various stages of our childhood, through canoe or boat build-

ing, and a double runner constructed after our own notions, to the jig-saw and perhaps a turning lathe, while some have even made an actual running steam-engine.

Thus it is that the inventor, like the poet, is not made, but is born. Thus we see the germs sprouting and growing, until his home is full of the products of his originality and his handiwork. So when it is time for him to choose his life labor, his talents are so well defined that, if the means are at hand, he is sent to intermingle with his natural foundation a scientific education.

In looking around and noting different inventors, we will find many of whom the following living person is a type. He is a man of no mean ability, but has spent his life upon small patents little needed by mankind. Having depended upon his patents for a living, he is consequently poor. Intense thinking on one subject has made him cranky. He has become thin, nervous and round shouldered. When you talk with him it is painful to watch him. He launches into his favorite subject. Those black eyes snap at every word. The nervous arms gesticulate more wildly than those of a Hoboken Dutchman. He talks incoherently, and if you do not understand what he means at once, he thinks the fault is in you and not in himself. He is next door to crazy.

Now, boys, look out. We're not going to revolutionize the world with a patent egg-beater. And let us not get so far "gone" on any subject as some of the "Stute boys" are on the French governess on H— St. Now, although we have got to choose a life work, and become interested in it, let us not get as "cranky" over it as, in another sense of the word, certain Profs. are. Let our brains be at work on *useful* subjects, and our inventive genius will bring credit to ourselves and to STEVENS. A.

A CAMERA-ITISH TALE.

With spring and pleasant weather comes the season for picnics, summer excursions and vacations, and along with these charming recreations comes, too, the ever present amateur photographer, the representative of a mighty tribe. In your meanderings among the mountains or seashore you find him and his camera, with all the adjustable automatic patent contraptions conceivable, planted ready for an "exposure." Thus it is that you are prevented from taking your best girl out for a

walk along some favorite path, and you are either compelled to leave her at home or to the walk and *treat her like a sister*. I can even think of casting a furtive and longing glance into her hazel eyes, even at the temptation of such a deed you are stopped by a mysterious sound which to the true amateur fotografites is known as "taking the slide out, preparatory to an exposure." Continuing, if you do gaze into her bewitching orbs with a countenance beaming with admiration, and she reciprocates the beam—click—six consecutive clicks, and you are brought to the despairing reality that your best girl's adoration has been transferred to six instantaneous dry plates, and you and your girl, beams and all, are booked for the amusement of posterity.

Again, suppose you see a lovely spot on some mountain road, and you climb up to enjoy its quiet and give yourself up to temptation, no sooner are you settled down feeling at ease in your supposed solitude than a voice from somewhere calls out: "If you please take your hat off for a moment and move your left arm a little, so that you get in that waterfall. I've got an American Co.'s improved camera and one of Stevens' quicker than lightning plates, and won't disturb you but for an instant." Being an accommodating spirit, you take your hat off and your left arm assumes the desired position. "That's all," calls the voice, and you are again contemplative. But shortly the other side of your resting place calls: "Will you kindly—;" but those three words are sufficient, and you leave your girl and hurry away, leaving the amateur to revel alone in his glory.

And so you travel to other parts, but where you will the innocent looking camera and its "Will you kindly, etc.," accompaniment is sure to confront you. The tribe is a large and flourishing colony at the Indicator and we publish the experience of one "inveterate" in the West, believing that "points" may be gained by its perusal. The story as told by a western paper is as follows:

"A breach of promise case is now pending in Marysville which exhibits some peculiar features. It seems the defendant, a man named Augustus Scudberry, is a member of that rapidly increasing class of persons known as amateur instantaneous photographers. This individual had become distinguished over the achievements of European photographers in obtaining negatives of

flying, horses running away, tigers seizing their prey, etc., that he made himself a holy nuisance prowling around after people with his portable camera, electric slides and things. One day he would be found ambushed beside the railway track, and filling up the switch tenders with beer, in the happy anticipation of catching a good impression of a first class smash up; the next, he was trying to bribe some dying man's family to allow him to take a snap shot at the patient just when the death rattle set in. In fact, it is stated that once, when some miners were having a terrible quarrel in a bar room, Scudberry suddenly appeared in the doorway with his instrument over his head and exclaimed excitedly:

"Wait until I put on a dry plate before you shoot, gentlemen! Get your pistols ready and fire together when I say three. I want to get in all the flashes." Well, as we were going to say, this same Scudberry was engaged to a girl named Pliffey, and somehow had got the idea into his head that Amelia—her name was Amelia, and she wore a number four shoe, which is mighty good for a Marysville girl—was untrue to him; in fact, that she was still encouraging the attentions of a dry goods clerk named Boggs.

"So Scudberry, having just received an automatic clock work attachment to his apparatus, carried his machine over to his fiance's house on pretence of taking the pictures of the family. He took Amelia's mother in the act of spanking the baby; he took the baby in the act of swallowing a pin; took the cat in the act of catching a mouse; took dinner and then took his leave. Scudberry explained that he was to be out of town that evening, and asked that his camera be allowed to stand in the corner of the parlor until his return the next day.

"That night Boggs, the alleged rival, called on Amelia, and it is natural to suppose that they were both unaware that the photographic apparatus in the corner—the lens of which was adjusted so as to rake the sofa fore and aft, so to speak—was automatically adjusted to take an instantaneous negative at precisely 11.30 p.m., that being the hour when the jealous Scudberry supposed the festivities would be in progress, if at all. At all events, the couple were startled at about that period by a peculiar click from Scudberry's machine, and which they understood better the next day, when that gentleman indignantly broke his engagement and exhibited a picture which he sarcastically labelled 'No. 461, Græco Roman Hugging Match.'

"Miss Pliffey immediately brought suit for breach of promise, Boggs testifying that he was only rehearsing a contemplated tableau with the plaintiff. Meanwhile Scudberry has filed the photograph as evidence, and the whole town is waiting anxiously for the verdict."

FL — T.—(An Ode.)

Who is that lass with gait so light,
With eyes how bright,
And flowing tresses dark as night?
Oh! glory, men! yes, glory all!
Before this beauty prostrate fall!
Venus has from heaven descended!
All our loathsome pains are ended,
All our briny tears are flown,
Lovely Venus reigns alone!

But mistake not! Lovely Venus
Is a goddess, is ethereal;
And this beauty is corporeal.
Therefore, mark well! she's not Venus!

"Let me then be up and doing;"
Beauty's charms are for the wooing!
Stepping slow, | But mark and hearken!
I bow quite low. | With eyes that "sparken,"

And cheeks aglow,
So lovingly glancing | This earthly beauty
With looks how entrancing. | Is now my booty!
For listen! List!
She softly cries:
"Ah there, my size!"

BILL.

AN INCIDENT OF BORDER LIFE.

They were rather a thriftless set at Jones's Ranch. Somehow there had never been much steadiness among them. There was always something gloomy about Texas life on the Border; there was always something to apprehend in a certain recklessness that infested the place—a sense of having shifted outside of the protection of divine and human laws. The cattle dealers about Jones's had never defined the rights of humanity. Their ideas of religion were as unasserting as their moral code. But there was a spirit of careless daring about this little colony of cosmopolites that had penetrated even beyond the Colorado Hills into the civilized life of East Texas. And occasionally in the dusk of Autumn evenings, while the yellow red glow of the sky still flooded the trembling sea of prairie grass and flowers, some dusty, world-worn traveller would struggle into camp and sit quite home-like around the fire, where if not wholly welcomed he was seldom turned away. And so the camp grew. But they had never flourished

regularly, and somewhere near the winter of '79 things went wrong altogether. The cold northers set in unexpectedly; there had been some heavy rainfalls already; the cattle were poorly sheltered and ill-fed; the provision wagon had not been heard of on Jones's side of the hills, and the northers had set in vigorously. They were "clean stuck," Bill said. And his opinion had not failed to carry weight.

Jones's set up to be quite a celebrity in a literary line. In an obscure ignorant way it was not without its appreciation of the power of knowledge. And the neighborhood was pondering over Bill's decision. The force of learning had of late often been a means of defence to the boy, excusing a certain wildness of habits and a disposition to prowls about the neighboring chicken sheds. It was not as if it had been mere theoretical matter—open to question. The family of Bill boasted in the possession of substantial proof. In a spirit of ostentation they had hung over their chimney place a rough hewn shingle, on which in great straggling chalk letters the word "BILL" had been printed. It had happened a year and more ago. Bill was just a little shaver then, and he had stood one morning on the door step of his father's cabin, slinging his rough bare foot backward and forward in the fresh, sweet April air, and idly expectorating in the direction of his toes. Such games, however, were not common about the place. You see, he was the only being that resembled a child in the camp. His mother had come out along with old Jones in the early days of the settlement, and what with growing rapidly accustomed to the roughness of the men's ways, and the gradual adoption of their more unobtrusive apparel, there was little of womanliness left about the woman. But just about seven years ago, somehow Bill was born, and since then the crude, raw cow boys at the ranch had regarded the mother with something of wonder and of shame. Fisty Bob, the most lawless of her old companions, had attempted once to define this feeling. "You see," he said, "it kinder blowed a man to have it flung up at him how he came into the world arter such a fashion." But the child grew to be something of a favorite with the men. They looked upon him in the light of their first native speculation. And though the boy was one of them, standing on old Jones's door step more than a year ago, there had seemed to be little that resembled the natural product about his drooping, tangled curls of yellow hair, and the baby light of blue-

ness that still lingered in his wide open eyes—making almost an active protest against the patient, tired outline of the tanned Colorado and the sluggish degradation which was the atmosphere of the place. That morning a party of strangers had ridden into camp. They had ridden over from Texas and were armed. They had come with an idea of settling if the place suited them. One of the men had stopped to speak to the boy. "Is this the ranch, boy?" he asked. "Dunno," the child responded coolly. He drew himself up in a line of defence. The woman had been listening inside the door. She put her head out. "What matter wi' yer?" she screamed. "Can yer tell 'im 'twas Jones's Ranch?" "Can he ask if 'twas Jones's Ranch?" the boy asked. The stranger threw back his head and laughed loudly. "What might the youngster be?" he questioned generally. And he thrust his brown, skinny wrists deep into the pockets of his bulgy breeches. How he never seemed to grow up in those breeches. He looked up at the man who had asked the question. "What'll yer gimme if I tell yer?" he asked. The strangers had departed the following day. The country did not please them. They would look farther out, they said. They had spoken rather contemptuously of the place to the settler. "Praps he calculated it was a fine crop of buzzards," one of them said jocosely. "You should move farther out," he argued. "I tell you there's gold in the hills of the river." But the cattle dealer was a progressive man. His organ of speech was rude and undeveloped. "If C. Jack and Fisty would go," he remarked what dubiously. And in general, when the matter was concerned, there was an absolute liveliness about the inhabitants of the Ranch. The man had taken a fancy to the boy. He had shown him how to print his name on a shingle with a bit of chalk stone. "There's much gold in the banks of the river," the child had asked curiously.

Things were now looking badly. The last seven days had brought no change. The storm continued to rage with violence, and a party of men, who had left the ranch the day before, scouring the country for stray cattle, returned with a report that the streams were greatly swollen—the "big" ford was up. The provision wagon had not been heard of on Jones's side of the hills. Along the camp loud sounds of rymaking and boisterousness issued from

lelujah roost, as "Californy's" cabin was called, where the boys were drowning the responsibilities of a dreaded to-morrow in the whiskey that still held out through to-day. But the woman was alone—sitting on the hearth of Jones's cabin, with her rough, unkempt head resting dejectedly against an old wooden bench. There was a sullenness about the silence in the room. It was not that her old hardihood had gone from her. It was not that she drooped under what had been endured, or that she could not yet have borne still more. It was that she could not bear it alone. Apart from the men for whom she had given her all, there arose a vision of the old life—the old comparative sinlessness. And the woman wept. The child had found her thus and had gone out and left her, closing the door with rough kindness behind him. Perhaps there was something that touched the boy in the tears of the only woman he had ever known. They were the only tears he had ever seen. After awhile he turned suddenly and again thrust his head in at the door. "Yer hev me ter look ter," he said. And he drew himself up with a new sense of responsibility. The woman lifted her head wearily. "Yer was always a good little un, Bill," she answered. Just then a fresh, rough burst of hilarity was heard along the ranch. Presently the door of the roost opened, and Fisty Bob stumbled out and along the prairie road. The boy put his hands up to his mouth. "Fi-i-sty!" he called. The man turned. "Hove ahead, old pard!" was the answer, and the child, running, caught up with him and swung on to his arm. He had an old, cast off spade in his hands. "Which way is the Yedda, Fisty?" he asked, panting breathlessly. The man nodded. "Yer'd have to take it dem straight, Billy," he answered, sportively. And thus they walked along, the man and the boy together, farther and still farther on. In the last hour the rain had ceased to fall, and the sunlight, struggling with the clouds, lent an appearance of murkiness to the atmosphere. It was very cold, and as they walked their heavy leggings sunk at every step into the wet sod of the plains. In the indefinite light the individuality of the man and of the boy seemed to blend into a solitary figure of motion, amid the great sea of prairie stillness.

The following day the provision wagon had driven up to the ranch. It was received with such a greeting as men, even of reckless natures, usually give to life and security

when they have all but felt the breath and looked into the jaws of death. The clouds had drifted away; the sun shone once more brightly, and the weather moderated. The teamsters, a couple of Mexican herders, had seen rough weather on the trip, but they had come safely into camp at last. It was not until the noon of the day afterward that the boy was discovered to be missing. Nor did he "turn up," as the "lassie," a brawny Texan, had predicted, either that day or the next. And on the third morning the clouds gathered again suddenly, and the rain fell in overwhelming torrents through the day. Toward night some one knocked at the door of Jones's cabin. Several of the men were drinking and playing poker around the fire, and there was a tipsy shout of welcome when the door opened to disclose the dark, haggard figure of Fisty. "The rain had held up," he said hoarsely. "He was off arter the boy. They could come if they liked." As he spoke, the wind whistled shrilly through the chinks in the cabin walls and in at the open door. The cattle dealer glanced at the long necked black bottle on the table, and then at the resolute attitude of the man standing in the doorway. He shivered. "And blasted if I don't call!" he cried excitedly a minute afterward, and spread his hand, four greasy, finger marked kings out upon the board. "Not to-night, Bob, old chap," he added feebly. "Not to-night." For a moment there was some commotion among the men around the table. Hot, heavy words, uttered in thick and scarcely intelligible voices, deafened the silence. And then the woman got up from her corner and pinned an old army blanket over her head and shoulders. "I'll walk a piece with yer, Fisty," she said. The man at the door turned his head rather awkwardly out into the uncomfortable night. "It's no fit tramp for yer, pardner," he objected not unkindly. But the woman answered almost fiercely: "Who should go out arter him sooner than her as brung him into misery!" And the man waited outside in silence, stamping his ill-covered, frozen feet for warmth against the bare, frozen earth.

They had not gone alone. One and another of the men had joined them; at first with lighted torches, which, however, in the high winds on the prairie were soon extinguished. As they passed the roost even Californy had sauntered out with an assumption of his usual gay humor. "He would take a hand in the deal," he remarked; "though 'peared like

'twas a losing game." There was a good deal of talking among the boys; rough, uncouth anecdotes of exploits with the pistol and the rope; anecdotes from their purely personal nature at times becoming dangerous, and the occasional notes of a profane drinking song. But as the night wore on, a sense of depression and of silence fell upon the little band. The atmosphere grew clearer, and at length the moon shone whitely, steadfastly above them, casting long, softening lines of light across the plains and the dark, hard features of the men. It was late when they reached the river—the thin, small stream of the Yedda, which was now a roaring, tossing flood of uncontrollable waters, spreading far and wide over and beyond its banks. Instinctively the men had sought the river, and instinctively they lingered, wandering helplessly, forlornly up and down its shores. Something in the greedy roaring of the whirlpool seemed to tell them that they need not seek further. And a little more than a mile up the river they came across the spade the boy had last been seen with, fastened securely in the ground, at the head of what seemed to them a new and shallow grave. The men wondered. "He were always a queer little chap," one of them said. And they were never to know—perhaps they would not even have understood the foolish, ignorant love that had sacrificed the life of the child. For suddenly, as they retraced their steps, there had been a terrible cry, and Fisty Bob was struggling in the surging mass of water, swimming with vigorous and resolute strokes in the direction of a whirlpool of debris and uprooted tree trunks—and what seemed in the strange uncertain glimmer of the moonlight—he had reached it, this dreaded something! He had taken a firm hold upon it! No; the resistless force of the torrent had borne him down. And now again the great strength of the man had prevailed. He had grasped his burden almost fiercely, and came powerfully, laboriously toward the shore. It was then that the little group of watchers on the land lost sight of him once more in the bellowing, relentless current. A few breathless seconds elapsed, and suddenly he appeared again almost near them. He had stemmed the torrent. A dozen men rushed recklessly into the river to drag them back to land. A dozen hands were extended to relieve him of his burden. But the man, weak and tottering, pushed them from him, and smoothed with a certain tenderness the little head of matted, yellow hair. "Yer see,

pardners," he said, smiling feebly, "set store by the chap."

They laid him in the hollow that himself had dug by the side of the river, and their ignorance they imagined that it was his wish. And Californy, grumbling, took his coat from his own back to wrap the lifeless figure. "Such a blasted cold," he added, in a general sort of apology to the group. But the woman stood apart, motionless and silent. "'Peared like enough," Fisty had muttered, drawing his wet coat sleeve sheepishly across his eyes. And so the men still lingered doubtless alike of the merciless clouds gathered overhead and the more increasing torrent—lingered until that had swept the mother's soul, more potent than the senseless, rocking waves broke forth into one long, continuous wail, and she fell forward in the saying upon God to help her. In the moments the men had gathered together, looking out upon the irresolute flood of water and over the drearier plains. "For the chap," one of them said at last, one after another, Californy last of all, knelt around the woman as she lay on the sands. They did not pray. They did not know the words of any prayer—knelt in awkward silence. And it was enough.

A part of this, among some other things, was told to me in '80, down at Hawley. The rest I have only guessed roughly was at Hawley's that I first made the acquaintance of the man they called "Fisty." He was not an attractive looking man, but they said he was leading a respectable life there, and entirely supported the family of his old companion, Jones.

ENGINEERING NOTE

The New York, West Shore & Buffalo Railway Co. have adopted for a portion of their line, what they consider the best automatic block signals that could be obtained. The portion thus supplied with the signals is the thirteen miles of track south of Buffalo and was equipped by Mr. George B. House, of Pittsburgh. It combines both pneumatic and electric signals, the power for pressing the air being furnished by horse power engines, located at each end of that portion of the line. The cost

air is conveyed through a pipe laid between the tracks, and at requisite distances semaphore signals for each track are placed, connected by a pipe with the main air pipe. These signals are operated by compressed air cylinders, and are controlled by short circuiting electric currents, the current passing through the wheels and axles of the train, from rail to rail. When a train passes into the block, the signal immediately behind the train shows danger. In addition, every switch upon this portion is so connected with the circuit in the track, that whenever the switch is opened, or a car standing upon the side track is removed to a point where it will interfere with traffic, danger signals are instantly shown. Two drawbridges are also connected with this system in the following manner: When a train passes over a point 8,000 feet from the bridge, an electric bell at the bridge is sounded continuously until the train has passed over a second point, 7,000 feet from the bridge, when the gong ceases to sound and the draw is locked by electricity. If, however, the draw be open before the train has arrived at the above-named points, a danger signal is automatically set by the turning of the draw. Should any break or other accident occur in the system, all signals are set at danger until the break has been repaired. Thus all responsibility of accidents happening to trains in this section of the line, rests solely upon the engineer of the train, everything depending upon his observance of the signals.

Mr. John Collett, State Geologist of Indiana, has been making experiments in regard to the crystallization of iron when subjected to a continuous strain, and has come to the conclusion that the best iron bridges, especially those of railways, will inevitably become dangerous from continuous use. Specimens of iron which Mr. Collett has collected were to have been sent here for Professor Thurston's investigation, but these have not yet reached here. Mr. Collett is, however, quite mistaken when he declares all railroad bridges to be open to this objection. He has probably been examining some of the older bridges, which have since been subjected to heavier loads than they were intended to carry. The *American Engineer* criticises Mr. Collett strongly, and says that a well built, properly dimensioned and properly cared for iron bridge is a permanent structure in the strictest sense of the word, and as safe after fifty years of service as after the day it was opened for

traffic. Attention is called to the fact that there is a great difference in the concentrated wheel loads of a freight engine built twenty years ago and the modern consolidation engine. There is no need to look to crystallization for explanation of the wearing out of these bridges, when the present methods of loading, and the old methods of dimensioning in iron, are understood and appreciated.

A rotary snow shovel has been invented by a Canadian, intended for use in railroad snow blockades. It consists of a screw constructed like a huge post hole cutter, and is operated in a similar manner, being mounted on a strong steel plate frame. The screw cuts into the snow, slicing away the drift and throwing it into a revolving fan, which projects it through a shoot, delivering it in a stream to one side of the railway. The power is supplied by a double cylinder engine, which, with boiler, water tank and coal bunkers, is carried on a heavy double truck car. The cutting screw and the carrying fan turn in opposite directions, so that the snow, put in motion in a direction opposite to that in which the screw is revolving, is caught by the fan and projected to a distance in the same direction.

S. S. S.

Contrary to the expectations of many, the S. S. S. has been quite successful with its sociables. The first of the series has been already described, and the duty of picturing the second one falls to my lot. Last Wednesday evening heralded the second of the series of sociables given by the Stevens Senior Social, and notwithstanding the inclemency of the weather, all who were expected made their appearance. A pleasant change was noticed in the hall, the walls being tastily decorated with a number of large flags, tennis rackets and lacrosse sticks. Everything about the hall had a home-like and pleasing appearance, and when at nine o'clock the band struck up the first waltz, every one knew that the success of number two was assured. At eleven there was an intermission, after which the cotillion began under the excellent leadership of Mr. Glasgow, and continued with but a short intermission for more than two hours. The favors were very pretty, and will help serve as remembrances of a very enjoyable evening. At two o'clock every one had gone home tired out, but with smiles of satisfaction on their faces at the second success of the S. S. S.

ELGY.

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IN our January number we have introduced two illustrations, kindly furnished by Mr. Williams, '85. It is our intention to continue this *as often* as convenient, but not to consider it a standing feature of the INDICATOR. The new headings for the different departments of our paper have also been designed by Mr. Williams, who without doubt well deserves the reputation he enjoys in the Institute of being quite an original artist. Now that the new Board of the INDICATOR has overcome its inertia, and is in working condition, we hope to be able to improve our journal with every additional number. Inviting the students and others to make free use of our columns for any communications, we beg the hearty support of all interested in our enterprise.

WE notice with pleasure the evident interest with which the students regard the idea of taking up the study of Political Economy. That our course in Logic is so extensive as to be well nigh superlative, is admitted by all; no one denies the fact that, considering the two subjects as connected with

our business, it should entirely supplant rather than be neglected. But this necessary; we should have some knowledge the fundamentals of Logic, and of this ledge we certainly can obtain a sufficient amount in one-half the time now allotted would seem that the time thus left free be spent in the study of Political Economy with such good results as to warrant the ending of the course in Logic.

The plan proposed by one of the students in a communication which appeared in the December number, seems to us an excellent suggestion, and it may be well to repeat here. The idea is to give to Logic one year only, and to take up Political Economy under other term. For instance, it is proposed to take up English Literature during the Freshman year, and during the Sophomore year study Fowler's English Language, Logic and Political Economy, giving to each one one year. It is evident that it would be more suitable to take up Literature during the first year, as a Freshman's tender mind would more readily grasp that subject than the other more advanced studies.

Seriously speaking, even our Professor of Belles Lettres seems to be in favor of Political Economy, as shown by the essay subject which he has given the Sophomore class this month. The subject referred to is "What are the advantages and disadvantages of a division of labor to the public, to employers, and to the employed?" This subject is easily seen, is without doubt, a subject included only under Political Economy, and giving the students such a subject for an essay it is plain that he thereby shows his approval of its being studied. Is it too much to hope that we shall see this change in the catalogue?

INDICATOR CARDS.

S. I. T. GLEE CLUB.—On Tuesday, February 10, most of the members of the Football Club and a few others assembled as usual at McLean's residence to hold the weekly business meeting.

meeting of the Glee Club. Mr. W. S. Dilworth, in his capacity of business manager, reported that no collections had been received either from the Freshmen or from the Senior Class committee. (Applause of the Sophomores and Juniors!) It was decided that the concert be held in the second week of March. A committee, consisting of Messrs. Burhorn and McLean, has been appointed to assist Mr. Dilworth in making the arrangements; tickets will be ready before long, while the programme will probably not be drawn up till next month. The interest evinced by "young Hoboken" during the practice singing, entered upon after the meeting, was great. They crowded Bloomfield Street in front of the house whence the music was "escaping" (later in the form of the club's little man, Mr. Hart), and very soon after a few howls of approbation, stone bouquets were thrown at the door and windows. Mr. Hart, who somehow did not appreciate this homage, soon made them "skip," as we have intimated above.

Mr. J. S. Camp, the director of the club, has "snap" enough for a dozen college glee clubs; in our place, he is "making things hum," as the boys say. We do not hesitate at all to say that, considering the work done at present by our football men, or rather *glucers*, and with the assistance of Mr. Camp, the concert will be of a character which will permit of favorable comparison with the various attempts of other colleges.

Brainard, '84, the president of last year's club, will probably be the warbler of the occasion. Messrs. Bristol, Mitchell and Thomas, '84, have been elected honorary members.

Those desiring to encourage the club may do so by securing tickets from any of the following committee, exclusive of the business manager: Baldwin and Clark, '85; Cotiart and Morton, '86; Flack and Hart, '87; and McLean and Hubbard, '88.

Remember, also, that all you do for the glee club will go also toward starting the gymnasium fund, for the benefit of which another concert will be held if the first one prove successful.

Prof. Leeds has lately called the attention of the Junior class to the state of the laboratory. He remarked to them in his customary humorous way that "somehow papers and weak acids—as *aqua regia*—found their way to the floor without anybody's assistance." Now he will hold every student directly responsible for the condition of his immediate

surroundings. We fully sympathize with the Professor in this matter, and would only add that he forbid the perambulations of some of the men, who meander all over the room asking everybody "whether these fumes (and here they poke the sweetly-smelling stuff right under one's nose) are those of acetic ether or burnt feathers." On the other hand we would also suggest that the supplies of reagents, instead of being out of sight whenever they are needed, be placed under the jurisdiction of one of the assistants, who, however, must not then be playing *tag* at the distance of five miles from the Institute. The inconvenience of having only two water-sinks for the whole room is also felt very severely. Still we agree with Prof. Leeds in thinking it is possible to keep the laboratory in a relatively decent condition by the co-operation of students with assistants.

SOCIAL.

Professor Thurston's reception to the members of the Senior Class occurred on January 30, and was one of the most pleasant affairs of an unusually gay season. The class was received by Professor and Mrs. Thurston, together with Miss Thurston and Miss Boughton, who came down from Vassar for the occasion, ably assisted by several of their young lady friends from Hoboken and vicinity. The hum of conversation was interspersed with selections by the Glee Club, which was in excellent voice. About half past ten a collation was served, after which was more music by the Club, ending in an open air serenade, and later dancing was indulged in.

Professor and Mrs. Wall, and Miss Wall, assisted by a number of young ladies, held a very pleasant reception on Saturday, February 9. The Senior Class, together with several members of the faculty, with their wives, were present. Tea was served at five o'clock by the young ladies, and after a pleasant chat the guests left at an early hour.

Prof. MacCord entertained a few of the Seniors on Friday the 6th inst. The evening was spent in a very pleasant manner with games, cards, etc.

GRADUATION EXERCISES.

The exercises to take place at this year's commencement have not yet been definitely settled upon. The graduating exercises will not, in all probability, differ from those of

previous years ; but in those preceding graduation there will be some new departures, prominent among which is a proposed excursion. The proposition is favorably regarded by the greater portion of the class ; but its feasibility, and, if practicable, the best method of carrying it out, have not yet been settled. The committee are continuing their investigations, and we shall, doubtless, before very long have definite information with regard to it. Another new feature which has been proposed is a ball, which was to have been held before commencement ; but it is thought advisable by many to postpone it until commencement, when it will be rendered much more pleasant by the presence of the relatives and friends of the students. Both of these projects, if they can be carried out at a reasonable expense, would be very pleasant : whether they shall be held, and if so, in what manner, remains to be decided.

THE COLLEGE PIN.

There are chronic growlers everywhere, and here at Stevens we evidently have our full share. Not long ago we had occasion to mention those who continually growled at the officers of the Athletic Association, and who, when asked to support said association, that it might be run more in accordance with their own ideas, promptly shook their heads. Even the INDICATOR in its past history has fallen somewhat under this evil ; but the latest object of attack of the chronic growler has been the College Pin.

Just before Thanksgiving, a joint committee, consisting of three men each from the Junior, Sophomore and Freshman classes, met to see about procuring designs and estimates for the College Pin. Soon after the members of the committee submitted designs from several prominent manufacturing jewellers, but these were set by until the college had been given a chance to send in designs. The interest shown by the students in this matter was entirely in keeping with their wonted indifference to anything relating to the college.

At a meeting in December, the committee passed judgment on more than a dozen designs, and selected several of them to be placed on the bulletin board, with a notice that the committee had selected them to be voted upon. Another notice was posted soliciting contributions of designs from the

students. This was a golden opportunity for the chronic growlers. They gathered about the bulletin board and uttered anathemas against the committee. No one contributed designs, but all were willing to criticise the committee. Altogether the college was more stirred up than it had been for many months. The designs were taken down, however, in order to give some of the chronic growlers a chance to draw some additional designs, and were not put up until after the holidays.

Up to this time the matter had not been strictly a college affair, as the Seniors had not yet put the matter upon the table at their last meeting. A college meeting was now called, and the committee reported that a selection of designs had been on the bulletin board for a week. The designs were then taken down, sketched upon the blackboard, and a vote was taken by the college. The college was divided between a bevel gear wheel, surmounted by a governor, designed by Mr. Kolb, '88 ; a wheel set upon a Maltese cross, bearing the college colors in enamel ; and a plain wheel, with the college colors in enamel between the spokes. The vote tied on the first ballot, resulting in another ballot, which gave the choice to the last mentioned pin. A motion was made to adopt that as the college pin. After an animated discussion the motion was put and declared lost. A motion was then made to refer the matter back to the committee, with instructions not to be limited by price.

A member of the committee took the first designs—which had been rejected on account of its price—and modified it. Mr. Kolb also made another drawing of the pin, altering it slightly. The chairman of the class committee canvassed his class for votes, and at a college meeting held the same afternoon it was reported to the college that the vote, 75 per cent. of the students had accepted the first design as modified. The report was accepted and carried, thus making this design the College Pin.

The pin consists of a gear wheel, surmounted by a transit, above which is a governor. The centre of the wheel is a front view of a locomotive, while underneath the wheel is a ribbon bearing the legend, 8—STEVENS in black enamel.

Those wishing to procure pins may do so by handing their order, accompanied by cash, to Mr. Merritt, '86 ; Mr. Theberger, or Mr. Kolb, '88.

tions published in the "Stuffing Box" of the last number of THE INDICATOR. He says that we either would or could not distinguish between *increasing* and *decreasing* functions. According to him, "the greater the ignorance the smaller the safety." If that be the case, we would suggest to the professor that he change the principle; instead of

"The factor of safety is a factor of ignorance," he may state that

"The factor of safety is a factor of $\frac{\text{one}}{\text{ignorance}}$."

Here comes a yaller dog. What is his name? It is James Donaldson. Is he ever called James Donaldson? No; life is too short for that. What then do they call the yaller dog? He is called Donald. Has he any other name? Yes, he is sometimes called "Jersey Lightning." What is "Jersey Lightning?" It is a mixture of H_2S and $\text{C}_2\text{H}_6\text{O}$. Is it a patent medicine? Yes, it is the invention of o. w. janitor. What does it cure? It cures colds, headache, etc. Would it cure the cold in the editor's room when there is no steam on? That depends on how much there is in the bottle. Where can I get this patent medicine? You might put up a notice on the bulletin board. What is a bulletin board? It is the place where o. w. janitor puts the boarding house advertisements. Do they have boarding houses here? Well, some; as, for example, the Police Court and the Tingle Tangle. What is that last place? It is a place where you can get $\text{H}_2\text{S} + \text{C}_2\text{H}_6\text{O}$. Will you show me the way to the Tingle Tangle? We rather guess not; ask o. w. janitor.

Scene in one of the Junior recitation rooms; death like stillness sticks out all over everything; students sit in strained positions, hardly daring to breathe; a musty smell and a primary-school-number-one A. D. 1812 hue predominate; a scarcely perceptible noise is heard from the back of the room; the Prof. glares steadily and immovably at the origin of coordinates of the noise, while the students hold their breaths and await the explosion of the dynamite (interval of five minutes); finally a student is called up; by some chance his eyes wander from the Prof.; another round is had with Deathlike Stillness (interval of ten minutes, during which it is so still that the silence stops eleven watches and the self-feeding stove); every lung is paralyzed *pro tem.*; the disintegration of the nitro-glycerine is secondly expected; the student on his feet thinks that every minute will be his next;

several students get black in the face; but a relief party is heard approaching; a jangling of chains and clicking of toe nails herald the coming of the Deliverer. Ha! he stops at the door; will he come in and break the spell, or will he go on up the six flights of stairs? he sniffs the odor laden air; with a sense long trained he finally separates the H_2S from a familiar perfume, and rushes in the refrigera—or rather room; the spell is broken; the nitro-glycerine explodes in the form of NEXT!! And the procession moves on, minus one member, who fell a victim by the wayside, but verily he will appear unto us again at the next *seance*. Selah!



Van Nostrand's magazine for February is as interesting as usual, and we wish for more to study the valuable matter contained in it.

We are glad to see that the *North-Western* hopes to get a new cover before long. We think a great deal of a neat, attractive cover.

We are amused by the new kind of novel issued by the *Yale Record*. The thought is a new and happy one. We look forward with pleasure to the next "standard novel." The style might be called short, and an ideal of the cheap literature.

We are always glad to receive the *Polytechnic*. It never fails in being interesting in all its departments. The January number contains a short sketch of some of the earlier and later works of George Eliot, which is well discussed. We congratulate the *Polytechnic*.

From *The Michigan Argonaut* we learn of the lack of a gymnasium at the University of Michigan. There seems to be too much talking there, as here, and no doing. We can heartily sympathize with them in that matter, and we agree that too much talking is done. We think our exchange is to be congratulated on its news departments.

Among our exchanges we see a new one, *The Holcad*, and as we read pieces of it we are favorably impressed. Its principal article is on Edgar Allan Poe, his life and character. *The Holcad* is not so elaborately gotten up as

some of our exchanges, but it will hold its own with all for the good sense of its articles.

Mechanics for February, as usual, is full of information. Links in the history of the locomotive occupies a prominent place. It contains a fac-simile of a sketch of the Rocket, taken in 1830 by Mr. Nasmyth. We are always struck by the excellence of the illustrations.

We are glad to see the change in the cover of the *Burr*. The design is a good one and we are not one bit surprised that the *Burr* should adopt the color of THE STEVENS INDICATOR. We admire their taste. If the *Burr* would only follow THE INDICATOR in some other respects, fewer editorials, for example, we have no doubt it would be much improved.

We are indeed sorry to have given the *Eighty-Four* the idea that we think it a rival. No, we do not consider it such. That the "84" will hold its members together we are sure, and we wish great success. It is very interesting to us to read over the letters from some of the old friends we have formed here, and to see how they are getting on during this their first year of work. May we ask the *Eighty-Four* for its continued support.

To us the most interesting article in *The American Engineer* is on the Critical Methods of Detecting Errors in Plane Surfaces. One method used is that of rays reflected into a telescope from the surface to be tested. Another, by means of the spherometer, for which it is claimed the capability of detecting errors bordering on one-five-hundred-thousandth of an inch. The same article is concluded in the next number of the paper. Both numbers are full of interest.

Time allows us to glance only at the two copies of the *Williams Athenaeum* just come. The usual variety and interest is seen and "No. 54" is a good sample of the "That won't go down."

The Virginia University magazine comes to hand just in time. It is, as usual, interesting and good. It contains several long articles, among which "Oliver Goldsmith" occupies the prominent place.

The following are at hand: *The Amherst Student*, *The Chronicle*, *Da Pauw Monthly*, *The Electrician and Electrical Engineer*, *Tech.*, *The Lafayette*, *The Weekly Courier*, *Queen's College Journal*.



An exchange has an article entitled "Religion at Harvard." It is not known how it got there.—*Boston Post*.

The dudes of '86 have to carry lead ballast in their pockets in the Chemical Laboratory now, as the draught is so strong in the new hood.

Little Johnny went to a full dress dinner the other day, and when he came home his mother asked him what the ladies wore? "I don't know," he said, I forgot to look under the table."

A specimen of class room wit: Prof.: "Gentlemen will please close their books." After a lapse of a few seconds, observing that his polite command had not been obeyed, he adds: "Those who are not gentlemen will please close their books."—*Brooklyn Union*.

The '87 man who "understands German tolerably well and can sometimes carry on a conversation in the language," has evidently got away ahead of his class, judging from the glaring legend pinned up on the bulletin board, "Wanted: a Die Anna-Lise; apply to w, f, d, c," etc.

An inventor of Parkesburg, W. Va., is reported to have discovered a substance that is as impervious and durable as glass, and like it, a non-conductor of electricity, and useful for many purposes. It cannot be broken by ordinary means; acids have no effect upon it, and it can be used as a substitute for India rubber.—*Brooklyn Union*.

Gracie (aged 7): "Oh, pa, did you know brother Bill was sick?" Fond Father: "You must say Will, not Bill, my daughter. What ails your brother?" Gracie (carefully): "Why, ma says he's—he's bil—willious." Readers desiring to laugh at the above will see ninth page for full directions, diagram, etc. If not satisfactory, send stamp and receive by return mail one bag of laughing gas. No laugh, no pay.—*Washington Hatchet*.

* THE *

Stevens Indicator

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HOBOKEN, N. J.

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There was a bold fisher-man set sail
from off Barnegat

But when he was off
Pimlico, did
The stormy winds did
Begin to blow.

And then he did
So gently glide
To the bottom of
The surging tide

He wriggled and he sciggled
In the water so briny-oh!
He yellowed and he bellowed
For help, but in vain.

His ghost did walk that very night
By the bedside of his Mary Jane.

T H E

Stevens Indicator.

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No. 3.

THE SURVEYOR AND THE SCHOOLMA'AM.

A FACT.

It was a land surveyor,
With his mysterious load
Of bright, three legged instruments,
Came striding down the road.

And just before the district school
He paused to take a sight,
And all the children came and stared
At his theodolite.

The little schoolma'am hurried out,
To see what caused the stir,
And one and all they took the man
For a photographer.

"And oh!" the little schoolma'am cried,
"How happy I should be
If you would take our likenesses—
My scholars all, and me."

The man (he was a wily wag).
Replied: "'Twould cost a sight
To photograph a district school
With a theodolite!"

But still the little schoolma'am begged,
And longed to have her way.
She searched her pocket book, and found
Two dollars she could pay

He said: "Although that isn't much
For taking such a view,
You're so hard up for likenesses
I guess I'll make it do!"

The schoolma'am scrubbed her little ones
With lavish soap and care,
And straightened down their pinafores,
And "slicked" their stubborn hair.

And then it was a goodly sight
To view that stiff thirteen;
Six boys and girls on either side,
The schoolma'am in between.

His big bandana then he spread,
And 'neath it took a look;
And sighted them sufficiently
And laughed until he shook.

The picture promising to send,
Nor waiting for the pay,
This graceless man took up his traps
And hurried on his way.

The picture—it was but a sketch
In pencil, nothing more—
Of those thirteen confiding ones
Grouped round the school house door.

And underneath this *photograph*
Was writ: "This is the sight
I took by Smithville's district school
Through my theodolite."

—INDEPENDENT.

COMMANDER GORRINGE AND HIS GREAT WORK.

In all probability there is in modern times no great work of engineering which created so great excitement at the time, and was so soon forgotten, as the transportation of the obelisk from Alexandria to New York. This obelisk is the companion to the one now on the Thames embankment, London, and originally stood before the Temple of the Sun, Heliopolis.

The removal of this great relic was first suggested in 1869, but it was not until 1879 that the matter had progressed so far as to call forth from William H. Vanderbilt a letter, addressed to the man whose name was to become immortalized by his daring departure from accustomed modes, Lieut. Commander Henry H. Gorringe, U. S. N.

It was in June, 1879, that Commander Gorringe began draughting his plans, and on January 22, 1882, fifteen months after the work of removal began, the obelisk was landed on the pedestal in Central Park. Few people have any idea of the engineering difficulties to be overcome, and still less of the political hindrances attending this removal. To use Commander Gorringe's own expressive words, "the work cost pounds where it might have cost dollars."

At the outset it was seen that the obelisk could not be towed across the broad Atlantic, although this manner of conveyance would be well enough in the cases of the Paris and the London obelisks, where the voyage was merely a coastwise one. It was necessary to carry the shaft in a vessel with adequate propelling

power of her own. To build a vessel around the obelisk would have cost very nearly as much as the entire amount to be paid for removal. This made it necessary for the commander to confine his plans to ordinary steamers.

At this juncture three plans were proposed to the commander, which can be best explained in his own words: "The first one was proposed by the owner of a bark that had been engaged in transporting heavy blocks of granite on deck; the weight of one block never exceeded thirty tons. He exhibited a photograph of the obelisk which showed water near by, and a plan of the deck of his bark, and said: 'I will moor my vessel here, lower the stone down on her deck, and then sail. When we reach New York we will not be in any hurry to set it up, for we will cart it about the country and make a good thing out of it, exhibiting it to the country folks.'" The engineer then gives four objections to using this plan. I quote two of them: "3d. His bark was only four hundred tons capacity, and the obelisk weighs two hundred and twenty tons. It would have been interesting to witness, from the deck of some other vessel, the performances of the bark at sea with the obelisk on her spar deck. 4th. There was not room enough anywhere on the deck of the bark for the obelisk."

The second plan was to get the obelisk somehow on the bottom of the bay with chains under it; these having been carried on board a steamer, the obelisk was to be raised until supported directly below the keel. As Gorringer ironically remarks, "no plan was submitted for getting it on the bottom of the bay, and no arrangement was proposed for securing the services of mariners for the voyage."

The third proposition was to encase the obelisk in wood enough to float it, and then tow the mass without steering it. There were, however, many objections to this plan also.

My intention is not to repeat a description of the methods employed by the engineer in the removal of this ponderous mass, but to briefly relate a few incidents tending to show that the difficulties were by no means removed by the completion of the plans. The first balk occurred when Commander Gorringer and his assistant, Lieut. Schroeder, tried to charter a steamer, first in America and then in England. They were entirely unsuccessful, and decided to purchase one when needed. When the party reached Alexandria they were

assailed by the newspapers, denounced at public meetings, threatened with personal violence by letter, and insulted on the street. After the authorities had given their consent and the work was begun, an Italian arrived on the scene and claimed the ground as his property. This resulted in a slight complication between Gorringer, the Italian, the American Consul and the Italian Vice Consul. Matters were straightened out, however, by Gorringer's threat to sue for heavy damages, and the affair was amicably settled by an agreement in regard to rent for the ground. Another attempt to prevent the removal of the obelisk was made through a creditor of the Egyptian Government, who attempted to serve a writ on the obelisk until his claim was paid. But when Gorringer gave the court to understand that no notice would be taken of the writ, and that he was prepared to resist any use of force to take possession of the obelisk, the writ was withheld. During the early part of the work, and when the men were excavating to reach the foundation, the mob of on-lookers was at times very threatening. One day, when the commander had reason to fear that the work might be interfered with, he wrapped the stars and stripes around the shaft, and, pointing to it, said significantly: "That obelisk is the property of the United States; touch it if you dare!" After that day there were no more attempts at destroying the obelisk.

Another example of what Mark Twain would call the "cussedness" of the Egyptians is shown in the fact that the authorities refused to allow of the transportation of the obelisk to the place of embarkation. In vain Commander Gorringer offered to repair all damage—they said that they were afraid *the weight would crush the sewers*—and the transporting cradle, costing \$5,100, had to be thrown away. The difficulties and expenses of the ten mile journey in a caisson were enormous, and hindrances seemed to multiply at every step in the removal. It is needless to enter into a detailed account of how, at the last moment, the officer in charge of the government store house managed to evade the order to furnish the commander with the timber used by the English a few years before; how the surf of one day destroyed the work of many days; how the caisson refused to slide down the ways, and had to be pushed inch by inch by hydraulic pumps; how a gale came up when the caisson was almost afloat and caused the whole structure to dash wildly about; how

he quietly got the proper authorities on the steamer Dessong to haul down Egyptian flag, while he hoisted United Nations at the peak and mast heads; and last, a little coastwise *steam launch* was to the government dry dock and taken so that Gorringer wouldn't have the dock.

A crew was finally got together (each inserted as soon as enlisted), the steamer, the obelisk and pedestal in her hold, set out at 2 p. m. of Saturday, June 12, that the Dessong steamed out of the dock and the persevering engineer felt at last at rest; but he was on a vessel of no nationality. She was not an American vessel and was not entitled to an American register. It was obviously inconvenient and risky to sail under the Egyptian flag in the alternative the commander decided to sail without nationality or register, taking the risk of having his steamer seized by any vessel of war at sea, or by the claims of any port he might be obliged to visit.

The following document is all that there is of the "ship's papers":

NEW YORK, 2d Dec. 1879, 12 o'clock m.
In consideration of the sum of £5,100, paid by Captain Gorringer, the Director General of Ports, duly authorized by the United States Government, transfers the S. S. *Gorringer*, with her equipment, into his possession, and recognizes that he is the sole proprietor from this moment.

The Director General of Ports,
J. H. CAILLARD.

He was at all cognizant of Custom House documents and general shipping documents, and he bears not the slightest resemblance to one of a "ship's papers."

When Commander Gorringer left Egypt he sailed away from his troubles. A few, relatively few, met him in New York. It was when his great work was all accomplished that his brother officers, jealous of his success, made the navy rather uncomfortable for him and he resigned. Not that he was a man affected by petty jealousies; but he had to superintend a ship building yard at Philadelphia, and knowing the feeling against him in certain naval circles, he wisely resigned. His indomitable pluck in mastering the details of his anomalous undertaking, his perseverance, and the masterly way in which he met the incidents of his life work, should

win for him eternal glory in the domains of science and art.

C.

ELECTRICAL UNITS.

Until recently it has been the practice to form new scientific names by anglicizing Greek and Latin words. This plan presents many advantages, particularly to those who have had the benefit of some instruction in those languages. Not only is it sometimes possible to determine the meaning of terms thus formed, but one of the chief advantages consists in the facility with which they are committed to memory. The nomenclature thus formed has also the merit of consistency. Within the last few years, however, especially in electrical work, this practice has seemingly been given up and a new nomenclature, which consists in the application of the names of noted discoverers in that science to the new units, and this nomenclature seems to have been generally adopted.

It seems to me that this procedure is greatly to be deprecated. Without an extensive knowledge of the history of the science, which few men beside the advanced scientists are able to attain, it is impossible to attach any meaning to the new names; and, even with such knowledge, it is very difficult to assign the proper definition to each without considerable confusion. Of course, the idea is to do honor to the eminent men who have founded the science, and this idea is a very praiseworthy one, but it is doubtful whether the same end could not have been attained as well in some other way, without confusing us and hindering us, as it inevitably must do to a greater or less extent.

Confusion and labor have also been caused by the incongruity of the values given the new units, which renders conversion into ordinary units difficult and laborious. Thus, the Watt, the unit of horse power, is equivalent to 107 ergs per second; the dyne or unit of force is 0.98 neg. Much trouble would be saved by changing these units so that their values may be some multiple of ten in the metric system.

It is proposed to change the unit of horse power, which is at present 33,000 foot-pounds per minute, in order to make it coincide with the electrical unit, which is 44,233 foot-pounds per minute. It is hard to see what advantage would be gained to engineers by this proceeding. To be sure, the old horse power is not very convenient, and does not correctly meas-

ure the capacity of an average horse, as it professes to do; but the new unit in point of convenience is much worse off, as it is also, as far as measuring the actual horse power is concerned, and when we add the inconvenience and confusion which would arise during the time of making the change, as well as the expense of changing our text books, etc., it seems unwise to take such a step. The system of units proposed by Mr. John W. Nystrom, and published in *Mechanics*, a few months ago, seems to offer many advantages over the present ones. The units are all formed from the metric system of decimal relation, and are derived from each other by extremely simple formulas. If these units are not adopted, it is to be hoped that some other way may be found out of the present difficulties.

R.

[The proposed system of units here referred to takes the main standard of quantity to be that which represents the work of one kilogrammeter. For distinction in the application of these terms to quantities of electricity, it is also proposed to abbreviate them as follows: *Kramet* for kilogrammeter, *gramet* for gram-meter, *milgramet* for milligrammeter.—EDS.]

WHEN I FIRST CAME TO STEVENS.

III.

But I must show you into the Laboratory! The first door to the left as you come in from Hudson street, sir,—just follow your nose! *Cave canem!* Beware of the dog! No, he is not in at present, but the professor is. Take off your hat, if you please, and hide it under your overcoat, or else outsiders will be unable to distinguish between your breath and the other perfumes which are sure to cling to you, filling up all hollows, chinks, and *vacua*; refrain from opening your mouth for the same reason! There is one of the assistants (ahem!) vulgarly denominated the "Kid" because he has all the distinguishing characteristics of that species, except cleanliness. As a rule you will find him blowing explosive glass bubbles, sucking at a student's "squirt bottle," or setting fire to the only dram of alcohol there is in the room. To-day, however, the professor being present, he seems to be very busy labelling an empty jug "Distilled Water, C. P."

Make yourself at home! Don't mind the

dark color of the walls and the ceiling; you know that sulphide of lead is black, do you not? It is true that those windows need multitudinous applications of "Ivory Soap," but you must not be too exacting. Every student has a set of reagent bottles labelled very neatly with the name of the substance it is alleged to contain, and with the name of the student himself. I did not know before that acetic acid has the same appearance as Hoboken mud; nor that the solution of ferric chloride is green. Sheets of paper partially hide the acid etchings on the desk, corroded as they are themselves by close acquaintance with acids. The aprons, also showing numerous attacks, are evidently often used to wipe the H Cl, H NO₃, etc., from the suffering fingers. In one case I actually can not say positively whether those digital appendices are colored yellow by frequent "approximations" with cigarettes or *aqua regia*. The hood you know all about, *n'est-ce pas?* as also those white fumes, occasional explosions, and cracking test tubes, which aid in varying the otherwise monotonous Chem.-Lab.-life. So let us take our hats, and leave. Shake your handkerchief, saturated with the Florida water she has sent you for your last birthday, until you think the new odor in the majority, take two or three good breaths to put your blood once more into circulation, and come along to the other Lab., the Physical one, reserved for seniors.

They ought to be in to-day; but, of course, as usual, the Senior thinks the Laboratory can do without him—we fully agree with him in this particular. The Ph. L. is a capacious room, resplendent with light, and with an atmosphere highly charged with electricity, as shown by the bristly appearance of Senior P.'s moustache. Glass cases, containing apparatuses, the names of which are unknown, inasmuch as they are not labelled, divide the hall into several divisions, each provided with a table for sitting and a chair for the feet.* At the first desk nearest the door Professor M. was seated working at something or other; at the second, one of the exceptionally punctilious Seniors sat reading the February number of the INDICATOR; at a third I actually noticed Senior P. hard at work in trying to damage some measuring apparatus. In the centre of the room three or four men stood discussing some weighty (at least I judge it so from the grin

* For the benefit of the uninitiated I desire to state that the above seems to be the way in which those two articles are *ordinarily* used at Stevens.

on their faces) question with Professor G. I was not allowed to stay long in that place, for one of the *gentlemen* kindly *helped* me out.

Then I thought of the High School next door. The "Preps." had already been sent home to their *mammas*, and the air was consequently pretty clear. Nothing special was noticeable except a shattered bulletin board, free from boarding house advertisements, though the school is under the supervision of the same "spirited" Janitor as the Institute! The absence of any wall pictures was also remarkable.

Finding that the article I was looking for, viz., the "Prep.," was not to be seen, though I opened eight drawers and spilt the contents of thirteen waste baskets, I wandered demurely away, after having cast one inquisitive glance into that highly classical arena of Prof. Kroeh, wherein Freshman and Junior alike fight terrible battles with French and German, being always, however, eminently successful in dangerously mutilating those two innocent idioms.

* * * * *

Some of the annotations here recorded have been ignominiously stigmatized as invectives, and I have repeatedly been threatened with disintegration by dynamite if I should not repudiate them all. The important lesson I have learned is, that it does not pay to be—

A FRESH MAN.

CUSTOM.

"If we live in Rome we must do as the Romans do." These words we have heard so often repeated that they have become nearly as familiar to us as our multiplication table or our A, B, C. We rehearse them to ourselves, or declaim them to others, whenever we wish to explain or defend our conformity to custom. And it appears that this powerful argument is often sufficient to fully convince us of the propriety of an action, although further down in the depths of the heart there may exist a doubt so strong that we cannot but feel that the action is wrong. Thus it is that we have become actual slaves to custom. Thus it is that custom stands over us as a tyrant, directing us in everything, from the most trifling detail of our dress to the most important of our moral actions. Let us first glance at it in its sphere of fashion.

When tall hats are the fashion you must wear a tall hat, no matter whether you are tall or short; no matter if for an hour or more you are obliged to stand with bended knees while

riding in the street car; no matter whether it makes you look like an idiot or the judge of the Supreme Court; no matter if it is hard, heavy, and stiff; no matter, if by stopping the circulation of the blood, it causes you a headache to wear it long at a time, you must be in the style. And so with pants. If fashion says tight, tight they must be, be you thin or fat; no matter whether your limbs look like pipe stems or Bologna sausages; no matter if you have to think of them at every movement, and cannot stoop low enough to reach anything upon the floor; no matter if it does take half an hour, some powder, and a shoe horn before you can get them on. What matters it? you are in *style*. Looks, comfort, time and patience are nothing when compared with style. So the lady must wear the fashionable color, whether becoming or not. Likewise with shoes, hair, and dress; but, worse than all, with those abominable things—corsets. Here it is that the old tyrant, custom, rules with a whalebone; yea, often with a rod of steel. Here it is that custom, while pretending to improve the form and figure, presses and distorts it out of its natural, well-proportioned and graceful shape to an unnatural, ill proportioned and sometimes disgraceful shape. Here the tyrant actually rules against the health of his subjects. Here is one of his laws which has often been an important factor in producing sickness, both of mother and of child.

We have now traced his power from when, in small and trivial matters, it was comparatively harmless, to more important matters, where it has, so many times, proved a serious injury to the body. So, as we follow it still further into the realm of moral action, we will find it in like manner to affect, not only the minor affairs of life, but also those where the question of right and wrong is undoubtedly concerned. We will find that, in the minds of many, it is a weighty consideration in the attempt to settle questions arising about such subjects as balls and theatre-going, which, as a general principle, may not be wrong in themselves when entered into with good judgment and discretion. We may trace its power onward, from step to step, through a great variety of phases, through "white lies" and deception, to cheating in school work, for which we might be suspended, and in which we would be ashamed to be *caught*, which injures ourselves and is unfair to those who are doing honest work. A short time ago I read an article comparing English and American students, which accredited the American with

being farther advanced and brighter than the English student, but it also noted the point of "cribbing" as being much more prevalent among the Americans. Now, although we like to be in advance of, and smarter, as we call it, than the Englishman, we would not relish our position to be questioned because of our actual knowledge, or our smartness to be offset by dishonesty. Nor more, would we like to have the standing of Stevens questioned, or its reputation sullied by this cause. We all know that "Honesty is the best policy," but we often disregard it to gain a temporary advantage. We feel that some excuse is needed, and it comes out in, "Well, if we live in Rome," etc., or, "They all do it," which is only the same old fallacious argument with another overcoat on. So we excuse even the misuse of our own endowments and of those possessed by woman, who was created, not to be disgraced, but to be loved and honored by man. Yes, even to crimes which we can call by many polite names. But stop—we are breaking too many commandments; and our reasoning has always assumed the same form. Church members do so, such a person does so, or, in other words, it is custom. In this way, to a greater or less extent, we allow custom to trample under his feet our knowledge of right and wrong. Not that custom is always an evil, for we may have good as well as bad customs. The actual mistake is in letting it rule us, no matter whether it be good or evil. The truth we should come to realize is, then, that custom cannot make black white, or wrong right. And if we would all work to make right the prevailing custom, then, if the old Roman saying does still continue to hold its influence over the mind of man, it cannot harm him.

HUGGING AT THE RINKS.

A SMALL BOY THINKS THAT IS THE CREAM OF ROLLER SKATING, AND RELATES HIS EXPERIENCE ON THE WHEELS.

"Say, Jim, did you ever have on a pair of them skates with wheels on?" inquired one boy of another.

"No, but I heard a heap 'bout 'em; as how all the people is crazier than bed bugs."

"Do yer know what makes 'em crazy? No, eh? Well, I'll just tell yer what makes 'em crazy. Yer kin jist bar witness yerself how young folkses like hugging. I know yer kin, 'caus I've seen yer layin' in the high grass alongside yer front steps watchin' Bill Jones hug

yer sister Annie, when I was layin' on other side. Gosh, he's a regular lem squeezer, ain't he? Well, as I was jist to tell yer, it's jist for huggin' that all the ple's got wild over skatin'. Las' night lady what lives next door to us sent over wanted ter know if I couldn't go ter the with her 'caus her father and brother were away, and she were afraid to go alor reckon she ain't got no feller. Well, my made me go, and gim me some mone; git in and git some skates, provided I witer take a hand at pilotin' 'em round the. When we got to the rink I started off a door and said I'd wait fer her when she out, but she made me go in with her, she wanted me to skate with her, seein' wan't nun of her gentleman friends goin' tther that evenin'—but she ain't got nun, she is homelier nor a one eyed poodle. took hold of my elbows and kinder dra me in, so I was perlite enuff to go. I go skates and put 'em on, and then loaded self on a pair of the derved little wa. Then she wanted me ter skate with her, didn't wait ter git my consent, but just t hold of my hands and started out, usin' more like handles to a walkin' stick than thing else. Them darned little wagons no fool things ter skate on, and 'caus didn't know how ter skate, and I d neither, we didn't git very far afore sun happened. The first thing I knew abo one of her skates was runnin kinder 'round among mine and the other 'un to tack toward the seats. Both were huntin some place ter stop, and she seemed k anxious ter have 'em git there. But the l act cum on when she giv up tryin' ter go ways ter onct, ter ketch her feet, and thre arms around me like Bill Jones did ar Annie, only she threw her hull weight i huggin'. My feet wasn't stationary with wagons on 'em, and when they did get a it took a yoke of oxen ter stop 'em, there was so much weight barin' on 'em know, Jim. I jist dropped the length c legs, and there wasn't no snow ter ma soft like there is on a slippery hill. Don know, Jim, the teacher let me stan' up a time for the last two days? Well, that's But yer see, Jim, here's the p'int. Eff a been strong enuff ter hold that girl u; can jist bet yer shoe strings I'd a had huggin'. I jist seen lots and lots of girl and fall inter the arms of some feller. jist hug her with all his might, too. It'

y of huggin' yer ever seen. Them s jist chune a fellow right up ter it r insperashun—but say, if yer ever t git a big girl what can't skate, fer id weight ain't no picnic. I jist ough, them rinks are regular huggin' *icago Tribune.*

DIFFERENT CLASSES AT STEVENS.

y differently the students of the ses at the college behave is notice-rybody.

gin with the Preps. or Sub-Fresh-: at once struck with their princi-nt, namely, cheek. They certainly ; the whole of cheek, and nothing Fortunately the college students tle to do with them beyond keep-om running off with the library of e, as they did with the Campus.

come to the Freshmen. How are, too! Their chief occupation knocking off each other's hats and with them, or else throwing them he book-cases in the library if they particularly funny. And if happy appen to be acquainted with one he upper class men, how grandly ut from the table, where he is inging his legs to and fro, "Hello, How are you?" And how enviously l at by his brother Freshmen who ortunate as he is.

ressible Sophomore comes next. is time, while waiting for his class ne around, in matching pennies. enny-matching has gone on until Sophomore has succeeded in win-pennies from his adverseries, he shouting: "Who wants to match

It occurred to me one day, as I ry, that some enterprising youth quite a trade by stocking himself s, and offering nine of them in ex-a dime, to some unlucky Soph. : of pennies has been exhausted, anxious to go on with his game ly lose some more).

ors ought to be above such little as those carried on by the two ;, however they indulge in throwing -balls and each other around the ably their gambols (or gambles) on in their class room, into the priv-

acy of which '86 men only dare to penetrate. The sounds which issue from this room at all hours of the day hint that the banjo craze has settled down very extensively on some member or members of '86. Another characteristic of the Juniors is their predilection toward sloping shop work.

It would be most presumptuous to criticise such a dignified being as a Stevens Senior. Looking up toward them, the lower class men are struck with the lateness of the hour at which they arrive at the college and the earliness at which they leave it. Perhaps some kind Senior can explain this for the benefit of those who expect to be Seniors "In the Sweet By and By."

Notwithstanding these differences between the classes, there is one feature which portrays itself in all the students at Stevens, from the frolicking Freshman to the sober Senior. Before examination there is the same anxiety visible on the countenances of all. After examination the same questions pass from mouth to mouth among the members of the several classes: "How did you get through?" and "What is your average?" or "Did you get any conditions?"

ENGINEERING NOTES.

TWO British torpedo cruisers are being built with the following dimensions: Length, 220 feet; breadth, 34 feet; depth, 11 feet; displacement, 1500 tons. They were estimated to make 16 1-2 knots an hour, being propelled by twin screw engines of 3,200 horse power. The armament of each vessel will consist of six machine guns and four five inch breech loading guns, together with an elaborate system of apparatus for torpedo discharging.

A company in England are executing considerable orders in channel steel of large sections for mine roof supporting beams, and props are also being made of the same material. Although the first cost of steel beams and props is, of course, in excess of that of wood, the fact that it can be removed without damage, for further use, will render it more economical in the end. In addition, the diminished space occupied, as compared with the heavy timbering now required, will be a great advantage, affording a better working headway, especially in shallow seams.

An indicator has been invented which is an entire departure from the former ideas and principles. The indicator is attached by a

coupling to an ordinary indicator cock, and consists of a cup shaped receptacle which is closed steam tight by a stiff diaphragm of tempered spring steel. Above the centre of the diaphragm is a small mirror hung upon a spring pivot in such a manner that it is tilted by the slight movement which the diaphragm undergoes under the varying pressures to which it is subjected in the working of the engine. This is made to cause a beam of light reflected from it to trace a vertical line on a screen upon which it may be thrown. An arm fastened to the bridge which supports the mirror is attached to a reducing motion which causes the beam of light to trace a horizontal line on the screen. When, by the combined motion of the diaphragm and cross head, the mirror is put into motion, the spot appears as a continuous line of light, taking the form of the card which the engine is making. The length of the card varies with the distance to which the screen is removed from the mirror; a distance of eight feet, for instance, will give a card five or six feet in length. The card may be traced by passing a pencil over a paper hung over the screen, keeping the pencil in the path of light.

An improved locomotive, built by the Lehigh Valley Railroad, made her trial trip on the New York division of that road a few weeks ago. It is constructed for the purpose of testing a peculiar valve motion which, it is claimed, will develop great speed. This is done by making the cylinders with steam and exhaust entirely independent, doing away with eccentrics and slide valves. The valves on each cylinder are worked by an arrangement of valve gear in which the motion is taken from the connecting rod and working entirely on true centres, there being no sliding surfaces. The steam valves being independent of the exhaust, the point of cut-off, or expansion, can be obtained without the corresponding back pressure and over compression. The point of compression can also be changed without altering the point of cut-off or expansion, so that the power of the cylinder at a given pressure can be utilized to much greater advantage. The weight of the engine is 47 tons, with a grate area of 37 square feet. The engine is also fitted with an independent steam pump and heater for feeding the boiler so as to put in water at nearly the boiling point, the heater being under the boiler.

A pneumatic tube system of signalling has been substituted for the bell cord on the trains

of the Pennsylvania Railroad. Each car has a rubber tube running under the bottom, and these are connected between the cars in the same way as the Westinghouse air-brake tubes. They are kept charged with a pressure of from a reservoir situated under the cab of the engine, and which is itself supplied from an air brake reservoir. The rubber tube leads to a small whistle valve in the cab of the engine which is so arranged that if the pressure in the tube is diminished the whistle will sound. In each car of the train is a valve which, upon being opened, allows the compressed air to escape from the signal tube, the action of the valves upon the whistle being instantaneous. The same effect is produced if an accident happens by which a car is detached from the train, the pressure is lowered, and the whistle sounds to warn the engineer.

A VALENTINE.

The Seniors need not think that they have monopoly on "engagements." The following valentine was stolen from the pocket of a Freshman, who, if not engaged, we think ought to be:

Who smiles to see you when you call?
Who runs to greet you in the hall?
Who'd like to see you play foot ball?
'Tis Aida.

Whose mother speaks with gracious lips?
And when the conversation trips
Begins to claim relationships?
'Tis Aida's.

Who sings "high C" with studied ease?
Whom do you find it fun to tease?
Who pouts sweet lips when you displease?
'Tis Aida.

Who has bright eyes and witching ways?
Who tennis and piano plays?
Whose voice is sweet beyond all praise?
'Tis Aida's.

Whose song is saddened now with grief?
Whose lonely heart asks quick relief?
Who prays your absence may be brief?
'Tis Aida.

Who secret hopes she may be thine?
Who longs to have some tender sign?
Who sends you now this Valentine?
'Tis ———

In answer to our inquiries the fellow confessed that he had responded in rhyme, and after much coaxing produced a copy. But we would spare our readers.

Stevens Indicator.

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Orders can be obtained at Luthin's book store, J.

We will please immediately notify us of any error in addresses or failure to receive the paper.

Contributors' full name, as well as his NOM DE PLUME, must accompany the article, as assurance of good faith; but it will not be published, unless desired. Contributions, subscriptions, advertisements, communications by mail, should be addressed to THE STEVENS INDICATOR, Stevens Institute, Hoboken,

IN one month from now we shall be enjoying the advantages of one of the best athletic fields in this country; so let us go to the Stevens Institute Athletic Grounds, and not as for years past, enjoying all the privileges of ownership have been pleased to exercise at the Cricket Grounds.

George eleven has long ago ceased to exist, and, if for no other reason, let the change be made for the sake of our love for the game. There is no such place as the St. George's Cricket Grounds.

All accounts of games and events should be headed Stevens Institute Athletic Grounds; but why the change, which has been made for the last few years, of calling it St. George's Grounds, is a question that need not trouble us. True, the St. Georges are to be proprietors to disinterested spectators who watch their method of spreading the game; but the Athletic Association of the grounds, should give it the United States name. Let them call it the Stevens Institute Athletic

AS our second term draws to a close those of us who are at all interested in athletics naturally begin to think of the prospects for our base ball team this year. The "growlers" will tell us if we do no better than last year, do not try at all. We cannot agree with them. Last year's was an entirely new team, and, as it did not practice over much, and nearly all its games were poorly arranged, we could not expect them to do all we wished for. This year our team will have had at least the experience of a few games, and besides that we hope all will take advantage of the place now rented for practice. Let more time be devoted to it and we are sure to do much better. A great deal rests with the Directors in their choosing of the team, in the arrangements for games. Last year but few games were played in Hoboken, and it seems strange to us that the team was sent to play in all sorts of places, when we have one of the best grounds in the country at our very door.

Again, we could never obtain a ball, when wanted, without hunting all over Hoboken for it. Why not have one, or, better, a number, in charge of some member of the team at the Institute?

Then no one could offer the excuse of having no time to practice. They have only to step out on the "campus," so called, and although it is not the best plan, has seen some excellent practice, and good playing has resulted from the few minutes, now and then, spent there. The team will probably be the same as last year's, except the pitcher and one or two out fielders. There is certainly enough good material at Stevens, and if the proper attention is given to the necessary practice, there is no reason why we should not have that pennant. One of the weakest points the Stevens team has always shown is in the batting. Proper practice in this direction has never been made much of. Let it be different this year, and no one, we are sure, will fail to hear that well known cry from the fence: "Stevens 'as bet."

COMMUNICATION.

To the Editors of the Indicator :

Through you I desire to say a few words to the students and alumni of our college.

After spending the longer part of a college year on the subject, we have at last selected a college pin which one and all admit is emblematic of our profession, and at the same time is a handsome ornament to wear.

One might ask, what more can we want? But it must be that the air—or something else in Hoboken—does not agree with my fellow students, for a *few* of them, after waiting until the college pin is selected and the steel dies made, suddenly awake to the importance of the subject—or else to their own importance—and want the whole matter reopened. And for what reason? you may say. Simply because they (the *few*) think that the majority have made a mistake, and are not capable of having a mind of their own, as *they* appear to have none.

The committee for several months worked with a determination to do their best for the interests of the college regardless of any personal likes or dislikes, and they repeatedly asked the assistance of their fellow students, who, with but a few exceptions, failed to respond. We obtained designs from every source we could, among them the well known houses in that line of business in New York, and then we spread the designs before the college, and put it to the individual vote of the students; and then, at a college meeting, that vote was confirmed, and, without a dissenting vote, the design selected as the *college pin*, and no one then, or afterward, presented any objections to the pin before the committee.

Now, granted that we could and would reopen the subject, what prospect would there be of improving our pin as selected, and pleasing the majority of the students? There is this prospect: these *few*, after having been given every opportunity to present *their* designs to the committee, or objecting to those presented by others, failed to do so or help the committee in any way.

They can find no fault with the pin selected, except that it is not quite small enough to suit their æsthetic ideas. Now, this infinitesimal part of the students say that they can design a pin that will startle—who? which? what? For this design of theirs they have borrowed the sign of their friend "Uncle Isaac," and, lopping off one of his arms, they take the two

remaining, and say that it is emblematic of the honorable profession of mechanical engineering. Now, I fail to agree with the I will grant them that it is symbolic chronic state (dead broke) of some of the students of M. E.

And now, my foolish virgins, I commend your zeal and good intentions, but remark that for many ages it has been the custom world over, to shut out those who come at the eleventh hour. Therefore I command you to give up the ghost, and may be at some time your fellow students may come to a realization of your importance, and give mighty intellects (?) an opportunity to come forth. But let me warn you, if they do, committee life "is not a happy one," the pathway is not covered with roses, and there are few thanks and many rebuffs.

We cannot all be pleased, and when the majority are, we should one and all, regardless of all personal feeling, join our hands and hold what has been done, and for once in college life have a mind of our own as to it, and not be changed with every wind from a wind bag, and, remembering we are all fellow students, let us act in harmony and good fellowship for one another.

Hoping what I have said may be to the spirit it is written—that of a friend to the fellow college mate—I remain,

Very truly, yours,

C. J. FIELD,
Chairman College Pin Committee

SOCIAL.

A series of receptions have been given by the Senior Class during the winter months by Professor and Mrs. Leeds, at their residence, in which the students have been entertained in the hospitable manner characterizing the entertainments of the host and hostess. Many lady friends have been present, and in the evening and conversation the evenings have passed very pleasantly.

Professor and Mrs. Thurston tendered to the Junior Class a reception on the evening of the 13th of February. Miss Thurston and Mr. Boughton came down from Vassar, this time accompanied by a number of Vassar ladies. With this welcome addition '86 made an unusually enjoyable evening. After the collation dancing began, and the Hoboken ladies vied with those from Vassar in the occasion one long to be remembered.

COMMENCEMENT NOTES.

Martinelli's has been chosen as the place for the class supper at the coming graduation exercises.

The following students have been chosen to take part in the class day exercises: Abbey, class orator; Hussey, class poet; Glasgow, author of Pipe Ode; Burchard, to deliver "Grinds;" Adriance, to deliver Ivy oration; Dilworth, to deliver closing address. It was decided to have no class prophet, but that a class history be given, the historian to be nominated by the committee.

THAT BALANCE.

When the report of the editors of THE STEVENS INDICATOR was read at the college meeting, it was stated that there was a balance in favor of the paper; care being taken, however, to make it plain to those concerned that this balance consisted mostly of unpaid subscriptions. The business manager has sent bills to the delinquents, hoping to swell the balance thereby.

Some have paid, others not, and what is worse, declare "that they have paid," and naturally object to paying twice for the same thing.

Unfortunately, we have no positive means of determining for ourselves the true state of the case, even if we desired to doubt the words of these people, which, however, we do not.

The advertising department of THE INDICATOR has paid, thanks to the efficient management of the first business manager, better than the subscription department.

The books of THE INDICATOR have never been up to a business man's standard. This is due, in a great measure, to the haste and uncertainty with which we were compelled to start, when the idea of maintaining a monthly was put in a tangible form.

When the old board went out of office, there was an attempt on the part of the newly elected officers to straighten out the financial affairs, which was only partially successful.

We have had trouble all along with differences, which, however, are small, and will not interfere, to any great account, with a correct balance, seldom exceeding one or two dollars.

The following is as correct a statement of the financial affairs of THE INDICATOR as can be had:

Due from advertisers, -	\$60 04
" subscribers, -	34 00
P. and L., -	1 91
Total, -	<u>\$95 95</u>

Printers' bill, -	\$29 15
INDICATOR Publishing Co.,	45 00
Total, -	<u>\$73 15</u>

Assets, -	\$95 95
Liabilities, -	73 15

Gain to THE INDICATOR, \$22 80

The above accounts have not been settled, because most, if not all, of our advertisers are companies that pay quarterly, and will not trouble themselves with a small bill at any and all times. As for the unpaid subscriptions, we have no control over that money at all; however, we are doing our best to collect as much of it as possible.

There will be enough good money to pay the printers' bill, which is the only account outside the college against us.

The \$22.80 balance will have to come out of what remains. If we cannot get it, the college will not be out of pocket one cent (as we look at it), because she advanced nothing in a financial way, and but a microscopic amount of literary work; to the latter cause was due the action of the Board of Editors in resigning as a body last January.

Following this action came the organization of THE INDICATOR Publishing Co., to which we wish every success.

MANAGER.

S. I. T. GLEE CLUB.

The concert of the Glee Club is to take place definitely, rain or shine, hot or cold, on Thursday evening, March 19, at "Odd Fellows' Hall." There is not the least doubt as to its success from the point of view of a musical critic. The choicest and most popular college airs will be represented on the programme, among others "George Washington" and "Three Little Kittens" by special request. The enthusiasm shown by all the members of the double octette is something extraordinary. Thrice each week have they made the walls of Mrs. MacLean's parlor re-echo with their sweet

harmony; there indeed they have left an indelible "mark" on the carpet, owing to the various rehearsals of the "dance" in G. W. The various men have also distinguished themselves in the different classes, by taking a leading part in the numerous songs, or bitter attempts at songs, *performed* by their classmates, who are without that "superior training" which the Club has enjoyed.

It will be noticed that only college tunes are studied by the Club, to the almost entire exclusion of so-called "classical music." The arguments advanced in support of this are, first, that students can do justice to songs that *come home to them*, as it were, while they can seldom be brought to such a degree of perfection as would be necessary for the delivery of music of a different kind; secondly, the audience that attends a students' concert does not expect an artistic performance, such as is alleged to be given at the multitude of concerts (?), etc., but it expects, and is not disappointed in our case, a display of college spirit.

Still, to assure the musical success in every direction, the excellent and popular "Valencia Orchestra" has kindly promised to assist with several numbers. Miss Dunn, a popular soprano *soloiste*, will also charm the audience. Playing on the banjo, as well as a *hop* after the concert, tends to add, in connection with the other features, that necessary "spice."

So much as regards the "musical success." Now, with reference to the *financial* success of the affair, we hope that *tout le monde* will put in an appearance, *i. e.*, in other and matter of fact business words, will—buy a ticket for fifty cents!!!

AMERICAN INSTITUTE OF MINING ENGINEERS.

The Society held their second session at the Institute, Wednesday morning, February 18, Professor Thurston giving up his lecture room for their use. The meeting was a full one, and a number of valuable papers were read. Some of the more important points of the proceedings we note for THE INDICATOR, from the account published in the *Iron Age*.

The first paper of the session, read by the secretary, was by W. J. Pierce, of New York City, on

THE COST OF GOLD MINING AND MILLING IN NOVA SCOTIA.

Since 1862, when statistics were first kept, 350,000 ounces of gold have been produced

from 470,000 tons of rock. The been from 10 dwts. to 1 ounce 2 dwts. with an average of 14 dwts. The show a steadily decreasing yield of ton, due chiefly to the more extensive machinery, which has permitted the lower grade ores. The paper contains an interesting matter, but our space is limited.

Mr. P. Barnes, of New York city, with a paper on

FUEL ECONOMY IN ENGINES AND

The paper set forth the need of intelligent and economical preparation of steam, pointed out the directions in which economy was to be sought, and made suggestions as to remedies and means.

Professor Thurston, in the discussion followed, briefly, but graphically, stated requirements and the limitations of economical working of the steam engines, and indicated the direction in which improvements would be met with in the future.

The paper of Mr. John Fulton, of Johnstown, Pa., was read by Dr. Raymer, on the subject was

THE SOURCE AND BEHAVIOR OF FIRE GAS IN THE MINES OF THE CAMBRIA IRON COMPANY, JOHNSTOWN, PA.

In the beginning of the paper the source and surroundings of Johnstown, situated on the cutting of the lower productive coal 500 feet deep, were sketched; a brief description of the coal beds and ore mines from which it appears that six of the coal mines and the iron ore mines are 10 to 200 feet above the valley and but one coal mine, now closed. The paper also gave detailed statements of fire gas in each mine and the explosion connection with it. The most disastrous explosions so far have occurred in the Cambria mines. The source of fire gas, causing fatal explosions in mines, has not received the full consideration as its importance warrants to demand. From the fact that it is found in all the coal beds mined into Johnstown, it has been inferred that each with its rich associated bituminous content produced the gas met with in their mine workings.

This inference was doubtless suggested in part at least, from the condition of the Cambria fields in the north east section of Johnstown. For it appears evident that the fire gas in these large coal beds was eliminated

transformed the normal coal into its condition of glassy anthracite, each bed being the chief source. It is quite possible in the mining operations in the Allegheny fields that gas may ascend from the upper beds of coal, if the latter are mined into. Three objections seem to undermine the assumption that the coal of Allegheny are the sources of fire gas: the fact that where one coal bed has been worked in part or entirely under another, the coal bed workings are entirely free

from coal beds are the sources of fire gas in a portion of the Allegheny field, then the same eastward in the same field should be free of gas. No gas has yet been found in a large number of mines east of Johnstown. The same absence of gas is noticed in the Allegheny of the Clearfield and Cumberland regions. Some of these mines have been worked above and below water level for the past twenty-five years without the discovery of the presence of gas.

From the discoveries of natural gas, the fire gas, during the past year in large quantities under the lower coal measures in Pennsylvania, beginning at Johnstown and extending westward to Pittsburgh, afford a solution in this portion of the Allegheny field, at least, of the true source of fire gas, or mine fire gas.

From the interest in the discovery of natural gas in the latter part of 1884, the Cambria Iron Company had a test well sunk on a short distance north of the passenger station at Johnstown. The test well is 1189 feet above ocean level, 12 feet under the cement coal bed, and the workable coal bed of the lower coal measures.

At a well depth of 640 feet, or 40 feet above tide, natural gas was reached, and down 40 feet, beginning in slate and ending in sand rock. The gas was ignited at the drill hole, giving a flame 3 feet in height, but the supply, however, soon showed signs of being exhausted. At 800 feet, 389 feet above the first gas horizon was found, less than the first. No gas was found. Salt water was reached at 680 feet from the top of well, 509 feet above tide, and a large supply 2130 feet below top, 941 feet above tide level. At 2800 feet drilling was abandoned.

The test bore hole indicated very clearly the source of the gas met with in the coal and iron mines of the Cambria Iron Company.

The gas has evidently ascended through the cracks, cleavage plane, openings and fissures of the intervening rocks, reaching the coal and iron ore beds above. This is corroborated by the fact that all issues of gas yet discovered have been found in the portions of the mines whose strata of underlying rocks have been flexured and broken, affording openings for the upward movement of the gas.

It is difficult to establish the exact place of the gas in the rocks here, whether the horizons in which the gas was found have been its normal home or secondary reservoirs; it seems reasonable to infer that it had its source in the Pocono sandstone, and also near the horizon of the carboniferous measures of Eastern Pennsylvania and Virginia. In the flashes and explosions of fire gas in these mines, the gas itself has always been the originating cause. The fine, dry dust has not been observed to contribute materially to the energy of the explosions, although certain qualities of this dust in mines will aggravate the destructiveness of explosions.

It is not the design of the writer to assume that the source of fire gas, met with in bituminous coal mines, is always found under coal measures; but from developments at Johnstown the inference leans in this direction, qualified by exceptional localities. The horizons of the gas wells in Western Pennsylvania are all beneath the coal measures. It will also be evident that in coal mining operations, where the gas may be met with at uncertain places, without warning, and from its imponderable character, not being generally sensible to smell, always invisible and only occasionally heard, great difficulty must continue to exist in defending the mines from explosions. The danger from this fire gas increases, as a general rule, westward; the past terrible explosions in the Connellsville region are examples in point. The only present well assured preventives consist in ample ventilation, using brattice cloth and safety lamps in advanced workings.

The third paper of the session was "Notes on the use of high explosions in the blast furnace, and of a water spray for cooling or blowing down," by W. J. Taylor, Chester, N. J. The last paper was an illustrated one on "A new regenerative hot blast oven," by John C. Long, Mechanicsburg, Pa.

At the close of the session the members and their ladies were entertained by President and Mrs. Morton at luncheon. The afternoon was devoted by the members to visiting points of interest to which invitations had been extended.

HIGH SCHOOL NOTES.

High School Athletic Association flourishing; \$2.51 in treasury.

The High School base ball team last year won six games and lost none. The foot ball team won five games and lost one.

The Preps. are anxious to arrange practice games of base ball with the college. Oblige them, by all means.

Senior "Prep." to baby "Prep." How came Prof. Notlimah to get that bruise on his face? B. P.—He told us he fell down on F—th street. S. "Prep." goes to F—th street and notices blood on lamp post. "Tumbles."

The nurses seen on the "Campus" at different times do not come to "mash," but to get Prof. Al—ch and R—t—'s "Preps."



At the invitation of Mr. Shippen, a number of students have organized a Polo Club, which will play at the Hoboken Rink. The number of members has been limited to twenty, and the list is already full. The officers elected are as follows:

President—WM. A. ADRIANCE.

Secretary—A. W. BURCHARD.

Treasurer—OSCAR H. BALDWIN.

The uniform which has been adopted consists of gray jersey knickerbockers and stockings, and a crimson cap.

The Rink is at the disposal of the club from five o'clock until seven p. m., and also after ten p. m. Practice is expected to begin at once, sticks, etc., being already provided. A challenge has already been received from Rutgers, but it was considered advisable not to accept it at present.

By the energetic work of the directors, a much more favorable arrangement has been made with the St. George Club, both as regards the finances and the privileges of Stevens' men. The lacrosse team can now play anywhere on the grounds. The team has re-

cently been admitted into the local association of New York and vicinity, and it is hoped will take a prominent place among the competing teams.

Messrs. Munkwitz and Cotiart represented Stevens at the late inter-collegiate athletic meeting. No business of particular interest to Stevens was transacted.



Vive la German language!

Where does *cast steel* come from?

Examinations loom up dimly on the horizon.

The deadly roller skating rink has come among us.

The favorite poet of the chemical laboratory—Hood.

The ho-moginous man of '86 prefers to make his *Z hete-roginous*, viz., ∞ .

It is a remarkable fact that the smaller a fellow's moustache is, the more he fondles it.

Three cheers for the Mining Engineers! May they come again some other Wednesday morning.

"I have this subject at my fingers' ends," said the student, as he unfolded his crib at examination.

For patent gas fixtures, apply to W. W. Th—. The above advertisement is inserted free of charge.

Appeal to O. W. J.: "Don't you think the skylights in the drawing rooms and the floor of the sanctum need cleaning?"

Professor (to student reciting on trusses): "What is the live load on a roof?"
Voice in back of room: "Cats."

In chemistry—Professor: "What is the commercial name of arsenious anhydride?"
Bright student: "Rough on rats, sir."

Professor to Monsieur C——: "Do you know what pig iron is?"

Monsieur C——: "Oui! Oui! Oui!"

Professor: "Mr.——, you see that this person is distinguished by the verb ending *ez*. That is the reason it is so *ez* to memorize."

Professor: "I would recommend you to get a lesson perfectly once. You don't know what a luxury it is to be confident in regard to your answers."

A new alphabet has been discovered; it is the a, b, c, of the M. E.'s profession. For further particulars, *vide* Rankine's "Machinery of Millwork," p. 1763½.

The Freshies need their pin feathers plucked, according to one of the Profs. Alas! some of the pin feathers pull so hard that the entire student is "plucked" with them.

The Freshmen are agonizing over the subject, "What are the Effects of Ill Luck upon Success in Life?" Ah! Professor, that's rather hard. So soon after Fowler, too.

We would advise those interested in Kinematics to read Section 149 of Prof. MacCord's book, which treats of the spherical-equiangular-logarithmic - spiral - conical - multilobe - bevel-gear-wheels.

Prof. G—— (lecturing to Seniors): "Now, by an *elaborate mathematical process*, we are enabled to arrive at the complex conclusion that

$$\frac{100}{100 + 1 + 1} = \frac{100}{102}.$$

A specimen of grammar school wit: Teacher: "Credible: what can be believed. Who can give me an example?" Small boy (in back seat): "That Jonah swallowed a whale is a credible story."

Two Juniors are working at the following problem in mechanics: What is the moment of the effort of the professor when he sits down on a student? [ED.'s REM.: "I don't think it is of any moment to know."]

A Sophomore has discovered the alarming fact that even stars *skate*. He says, in a poem dedicated to Miss ——:

"Your lovely eyes, my darling mate,
Like heavenly stars do *coruscate*."

A Preventive of sea sickness, according to Prof. M., is to keep your eye on the horizon, since "it is the natural tendency of man to keep straight." We would advise O. W. J. to look at the horizon the next time he is "half seas o'er."

Professor: "You have heard of the rose of a watering pot? Very well; now tell me, why is the rose the queen of flowers? Give it up? Because it reigns (rains) over them all.

Funny Student: "Shall we put that in our note books, professor?"

One noon, when the fire bell rang, a dozen Freshmen started for Engine No. 1. After dragging the machine around the principal streets of the town, it was ascertained that there was no fire. After laboriously climbing a hill, the boys left the machine and returned to the Institute. Each participant expects to be invited to the hop of Engine No. 1.

Will somebody inform us who it was that addressed E. F. W. by "Wee-Wee"? Was it done because E. F. is diminutive? In that case we beg to differ. E. F. W. is "great," or at least thinks he is, and consequently ought to be called "I, I," or perhaps "We, We." However that may be, the epithet will, without doubt, stick to him to the end of his Institute career.

A spirited debate was held the other day between several members of the Junior class, as to whether pig iron is pig iron before it is cast in *pigs*. The professor to whom the question was ultimately referred decided that pig iron must be in pigs in order to be pig iron. Query: Is cast iron cast iron before it is cast? and is weld iron weld iron before it is welded? and is wrought iron wrought iron before it is wrought?

The class of '88 are working in the shop under a systematic and well laid out roster, which Mr. Lackland says is very satisfactory. The entire course for each man is spaced up into a certain number of days for each department, and the dates for beginning and finishing each particular course are assigned. It is hoped that this plan will do away with many of the evils which existed when no definite plan was adhered to.

Sample questions in the chemistry room: "Is this er-r—was the—er—basic charge—er—entirely basic—er?"

Student: "Not prepared on that part."

"What—er-r—is the—er-r—cause of elimination of the—er-r—elements by that time—er-r—the time—er-r—the time—er-r—the iron—er-r—had taken up—er?"

Student (who has forgotten the first part of the question): "Yes, sir; I think it is."

A student, statistically inclined, counted 83

"ers" in 11 minutes last chemistry recitation.
This would make 452.35+ in an hour.
Be gentle to the er-r-ring.

JUNIORS' SONG.

Though we pore o'er Wood's Resistance,
Or in Rankine all the day,
Trust us, we are not oblivious
Of our maidens far away.

Though we live in far-off places,
Working ever day by day,
We remember your dear faces
Through the long and busy day.

Living up in dismal attics,
Or in a daisy little flat,
Reading toughest mathematics,
Physic, science or Kinemat'.

Fumbling leaves of dictionary,
Drawing plans for our the-sis,
We remember pretty Jessie,
Lively Carrie and Louise.

Though we're deep in autographic
Tests of old iron from a rail,
We cast aside things mathematic
When the postman brings our mail.



We are surprised to see *Tech* make a mistake. We can't imagine why it should address us as the "Stephens Indicator."

Another exchange always pleases us, the *Adelphian*. Its cuts are always good and also its reading matter.

The *American Engineer*, we need hardly say, is interesting. It always is, and this time "The Mexican Railway System" occupies a prominent place. It contains a number of short articles and notes.

The *Amherst Student* for February is full of interest to us. News takes up most room and the collection of articles is very good. They complain of their "worthy janitor." Stevens men will not think that out of the way we are sure.

The *Haverfordian* is a model publication from cover to cover. It is well printed, well arranged, and best of all, well written. All its articles are sensible and worth reading. "The story of Port Royal and Louis XIV.," taken from Prof. Davenport's lecture, occupies a goodly space and is very interesting. We commend the *Haverfordian* to the attention of all.

We are glad to see a little appreciation of the January *INDICATOR*, especially as it is from one of our exchanges. We quote from the *Hudson County Democrat-Advertiser* for the benefit of those (the "chronic growlers") who do not subscribe nor take any interest in the *INDICATOR* (they do read it though, strange to say). "The first copy of the *STEVENS INDICATOR*, published under the new management has made its appearance, and, though much behind time, is a decidedly creditable production. Its contents are an improvement upon the former issues, and the attractiveness of the monthly is enhanced by a fairly well done cartoon on the first page."



The Mother Hubbard is of such frightful mien,
That to be hated needs but to be seen;
But when surmounted by a pretty face
We first endure, then pity, then embrace.

—*Wooster Collegian*.

"Make a minute of that duel at Princeton, Mr. Shearer," said the chief to the news editor. "Can't do it," replied the subaltern. "Why not?" "'Cause there are only two seconds in it." [Verdict of accidental death caused by a sudden increase of salary.]—*Targum*.

A Mormon editor of Salt Lake City had the following in a recent issue of his paper: "The unknown woman who was killed at this place about three months ago by the cars, proves to be one of the wives of the editor of this paper." A new count appears to have revealed the fact.—*Carl Pretzel's Weekly*.

Professor, who has been trying for the last half hour to explain a formula on the board, turns with his finger on his nose, which is rather prominent, and says, "Is it now apparent to you all?" (Freshmen grin.) "I am aware, gentlemen, that it is long (Freshmen grin audibly), but I hope you see the point." (Slight pedal applause). "It is called *pons asinorum*, of which I hope you see the application." (Loud and continued applause.)—*De Pauw Monthly*.

Vol. 1. No. 4.

* UK *

Stevens Indicator

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NEW YORK, 1885.

THE STEVENS INDICATOR

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HOBOKEN, N. J., APRIL, 1885.

No. 4.

THE BOARDING HOUSE.*

As on the street, in idle thought,
I wandered slow one day,
A withered, bent, misshapen man
Across my path did stray.

Gray were his locks ; his woful air,
So hopeless of relief,
Told plainly that for many a day,
He'd wrestled with a grief.

"Alas !" said I, "poor, wretched man,
What hath your grace destroyed ?
Mayhap your baby fingers rash
With dynamite have toyed ?

"Or, when a careless, happy child,
O' graceful air and look,
Upon the flying bolttail car †
You have essayed to hook,

"Until the thing has lurched, and then,
To your intense surprise,
Did throw you, and your baby form
Attempt to pulverize."

The stranger stopped ; fast down his cheek
The briny flood did flow.
I much did grieve to see that I
Had agonized him so.

"Alas, far worse ! I am," said he,
In tones most dolorous,
"A victim of that engine dire
Known as the boarding house.

"While yet a youth, bright eyed and strong,
And quick of thought and word,
I in an evil hour did seek
A boarding house to board.

"In yonder halcyon days no woe
My heart did desolate ;
My stomach had not gone astray,
And both my legs were straight.

"The tough and ductile buckwheat cake ‡
No horror had for me ;
Death's angel lurking in the pie
I had not learned to see.

"And with a simple, childlike faith
I chewed the mystic hash,
And on the bogus sirloin steak §
My youthful teeth did smash.

"But this for any stomach was
Too much, however stout,
And this pernicious sort of grub
Did quickly knock me out.

"Palate and appetite, once so keen,
Did soon begin to fail ;
It matters not now if I dine
On snipes on toast or nails.

"The swan's down mattress on my couch
Was far from being fat,
And soon upon my fle-h I bore
The impress of the slat.

"Extending on a three foot bed,
This six foot frame of mine,
Was not a thing conducive
To a rectilinear spine.

"And this the reason is, that now,
Most painful to the view,
My once artistic vertebræ
Crooks like the letter U.

"Bad light and smoky atmosphere
Did add unto my woes—
My right eye scans the zenith, while
My left surveys my toes.

"And now, sir, can you wonder
That at the bitter end,
Beneath this heavy load of grief,
My legs began to bend ?

"No longer are they shapely,
No longer strong and straight ;
My knees have had a quarrel,
And sworn to separate.

"And so I wander sadly,
Of shape and grace bereft ;
Of all my former beauty
There's none to speak of left."

The relic closed, and sadly
His painful way pursued,
And, with a sigh of pity,
His retreating form I viewed.

Some thought I'd had of boarding,
But needless 'tis to state
'Twas fully frightened out of me
By the relic's frightful fate.

THE ORIGINAL JOHN SMITH.

* For regard to boarding houses, consult "Baxter's Saints' Rest."
† Researches upon the Antagonistic Properties of the Bob Tail Car,
vol. of the *Franklin Institute*, vol. lxii., 1882.
‡ See William Thompson "On the Buckwheat Cake," p. 67.
§ In showing resistance of sirloin steak, see *Materials of En-*
g., part iv. [In press.]

ANTHONY TROLLOPE'S METHOD OF LITERARY WORK.

Anthony Trollope was a most unhappy youth. He was a pupil in several good schools, where the best of instruction and pleasant associates might have been enjoyed. But he was disagreeable and awkward, his parents were poor, and he had no ambition to learn, so that he was disliked by all and came out of school with but little more knowledge than he had when he entered. His education was completed in after life by his own efforts.

Throughout the first half of his literary career, Mr. Trollope was engaged in other business. He was employed by the English government in the post office department, in such a capacity that his duties required considerable travelling. Indeed, a very large portion of his time was on the boat or in the railway coach. He was now fully convinced that his living must be earned by his pen, and that, too, by his novel writing; and as he could not afford to give up his position in the post office, his time for literary work was necessarily limited. Realizing the great amount of time spent in travelling, he invented a portable desk which could be used on the cars or boat. He very soon accustomed himself to writing under these circumstances, and by utilizing this time he accomplished a great amount of work. Some of his very best works were written under such circumstances. In later life, after the post office had been abandoned, it was his habit to rise at half past five, and, in the quietness of early morning, with clear head and refreshed body, devote three hours to his work. This time was not spent in nibbling his pen or vainly seeking for thoughts and words, but in constant work. He was for the time in another realm. He knew what he wanted to say and could transfer his thoughts to words with wonderful rapidity. Anthony Trollope did not have to wait until he was inspired before he could take up his task, but could, as the appointed hour came daily round, inspire himself.

By this strict application, and by his natural fitness for the work, he acquired a rapidity of writing such as few authors have ever possessed. Long training enabled him to write two hundred and fifty words in every fifteen minutes that he was at work, and finally, he so systematized his labor, that this practice became a rule which was rarely broken. Hence, as a result of rapidity and daily labor, a vast

quantity of work was produced. According to his own statement, he has contributed to English literature than any other living author.

With his duties thus methodically arranged, he was able to reckon his time with great accuracy. If a novel was promised to a publisher at a certain time, he knew that it was just so many days beforehand it would be completed at the appointed day. He was free from the hurry and bustle of those who are continually late, and from the anxiety and worry of those who never know at any point they will be able to accomplish their work. He was always punctual. He always told just how many pages of a novel he had written, and just how many more would be required for its completion.

His plan was to show strict honesty in his work. As he held it important to maintain integrity in business transactions, so he carried the same rule over into his literary work. He was ever rigidly carried out. Whenever he borrowed anything from other resources than his own, and that was very seldom, it was always acknowledged. Those who borrowed material from other authors, and gave it out as their own, were held in low estimation by this novelist, who never lacked matter for his own use.

Not only in the performance of his labors did he have a definite plan, but in the development of his characters, and in the portrayal of his pictures he always had a purpose in view, which was that his characters should act naturally. Whatever the plot, whatever the scene, whatever the crisis, he endeavored ever to make his novels represent the real life, that the reader might see in them human nature in its varied aspects. He sometimes succeeded in this in spite of the criticism of Hawthorne, who said, "Novels are just as real as if some giant had hewn a great lump out of the earth, and set it under a glass case, with all its inhabitants going about their daily business and not suspecting that they were being made a show of." Anthony Trollope tried to show men the character, to point out their faults and before them the beauty and manliness of an upright life.

He was intimately acquainted with his characters. They were to him as real people. Although he had a large number of friends and took great pleasure in the society of many men, yet when sitting in his study thinking over his works he was in just

company of friends and in just as a society. Every face was as distinct and as was the face of any real person; knew every trait of character and manner of dress. Thus it was that he wrote about them, for he knew of what he was writing. By having a method, and to the time of working and as to the work to be done, and by having a purpose while developing his characters, he imposed on himself regular habits of life and to a logical way of thinking. Indifferent to results at the outset, he worked quietly in his daily task, taking for his motto, *dies sine linea*," and remembering that dropping wears the stone. Every day he took a step in advance, every day he accomplished something, and thus only can he who hopes to make the most of his

MATHEMATICS.

is a remarkable and consoling fact," a well known writer, "that many great men hated arithmetic. They have had flowers, who have resembled them in else."

hatred, shown already at the threshold of mathematics, has prevented many of those "men" to enter the gaudy edifice of "arts" with the same delight that they find at the threshold of a coffee house, or a Jarville. And, verily, it must be acknowledged that there is more attraction in an interest in the latter species than in that cold, though lofty vault where numbers, formulae, and the like lie interred like stones. There no sound is heard but the most obsolete whizz of the rattan, the solemn "one times one is one," the a^2 , Cold and passionless, embalmed in innumerable as the stars, surrounded by mystic signs apparently of the most glaring eyes look the wild numbers to the uninitiated necromancy is not prehensible.

Under, then, that men of a vivid imagination, a dull understanding; of a desultory earnestness, or a lazy nonchalance; of a higher philosophy, or a dislike for any philosophy; no wonder, I say, that such men and by those livid, uninteresting, almost diabolical orbs that glare at them when they mine one of the mummies, the books.

It is very natural, also, when the restless child, teeming with life, finds it a drudgery to study these dead. A liking or a taste for mathematics must be gradually developed. It is a study totally different from any other; entirely abstract in nature; absolute in its decrees; correct in its results; eternal, if man's mind be eternal. It is the stepping stone for most of the other sciences, not to be dispensed with, and *unique* in the practice it gives to the mind. For the engineer, of course, it is all in all.

To the superficial, indeed, this science is quite uninteresting. The symbols and diagrams, he thinks, were invented merely to baffle the student. But,

To him who in the love of the science holds
Communion with her visible forms, she speaks
A various language.

He, who with a penetrating look gazes steadfastly at those embalmed remains of Euclid, Archimedes, Descartes, and others, will find that his dislike will gradually thaw away, like love under the sun of matrimony; that in proportion as he pierces deeper and deeper to the dark recesses of this apparently stiff "affair" (stiff and formal as a maiden aunt), will he find that mathematics is dead only to the ignorant, but sensibly alive to the wise.

On examining closely the lordly palace of mathematics, he will discover connecting doors that lead to the palaces as well as the huts of almost all the other sciences; it may, in fact, be called the science² (squared), the science of sciences.

But, alas! the objection is raised that neither the science² nor its professed professors are much admired; and, according to Bacon's philosophy, since the fact does not agree with our theory, our theory is "left." Still, although the burden of proof lies on this side of the question, we need not despair. The science² is never hated for its own sake; it can be only misconceived. As a science, and its votaries or instructors form an indivisible alloy, the hatred felt for the one is necessarily extended to the other; also conversely, the love for the other stretched to the one.

It is to be regretted that so many mathematicians, breathing the somewhat putrid air of the tomb of Math., are turned themselves into mummies, though not dead, passive mummies, but live, active ones.

How much are we to be envied, we who are free from any of these modern fossils!

M. A. TH.

SPRING.

We see by an exchange that a dizzy, dizzy poet named Archibald, chirruping with both jaws the question, "Spring, spring! Oh, what is spring!" Now, what's the matter with you, any way, Archibald? You must be deaf, dumb and blind, and so badly paralyzed that you can't think, if you don't know what spring is. You must have sprouted up way back among the Hoodoos. Besides, you are pretty late in the day to be inquiring about spring. You ought to have asked us last fall, when we had plenty of time to tend to such matters; but still we haven't the heart to refuse you outright, so just lay aside your second hand lyre and give us a chance to warble.

Spring, dear boy, is a pretty prickly thing-umberbob to monkey with, on account of its extreme cussedness. It sneaks in on a man when he has all his winter flannels on, and makes his celluloid collar wilt and cavort down the inside of his undershirt. This makes the man believe that spring has got a pretty solid kind of a grip on the surrounding landscape, so straightway he goes and hops out of his winter flannels and stores them in a red valise and takes them down to "uncle." And "uncle" dealeth out shekels thereon, where-with the man can purchase pretzels and the foaming beer. But right here is where spring gets off one of its big shyster acts. The man don't get more than four blocks away from "uncle's" before spring gets skittish and goes rushing off to East Africa or some other gummy locality, where it sticks long enough to give the man a good chance for a good, big, double breasted yearn for his winter flannel. But that is not all there is to spring. Oh, no; not at all! Just gather in your pedal extremities and we'll spread out a little more extensively on spring.

After spring gets through galloping all over the universe, it generally settles down for a time, but it does so in such a fiery, untamed way, that's enough to give anyone the cholera morbus to think about it. A man may be walking along as innocent as possible, when all of a sudden spring jumps right on to him and takes up a permanent residence in his lung, and the poor critter spends the rest of the season trying to heave that particular lung into space. Then, again, spring will grab hold of a man like a Durham bull and take all the starch out of his shape in about fifteen minutes. And then people say he has captured

the malaria or the spring fever. We all right. We had that once, but we show up at lecture time just the same see that's what makes us call spring in some respects. It may be wrestling man for all it's worth and yet the res population don't know anything about that the man has to go right along as to his regular duties besides carrying extensive row with spring. Some of that didn't have any intellect at all, but "Spring, spring, *gentle* spring." Well as badly off as you are, dear Archie, saw anything very gentle about spring because he couldn't see anywhere near enough to be of any service to him. I wait till spring gets hold of your fra rips it up in the most approved style, if you don't think that man was a If you don't, why then you are a big yourself; so be careful, dear boy, no too fly about drawing your conclusion.

Spring belongs to that class of individuals who can "Smile and smile, and be a still." For example: Phyllis gets up morning and takes a bird's eye view back yard, and observes that Nature is ing about as broad a smile as it is capable of supporting, so she climbs into her new foulard polonaise with bias puffs and cuffs, flounces all over it, and slaps on her spring bonnet, shaped on a grape basket, sallies forth to captivate some brood of duds who may have wandered from the city. But spring don't favor any such proceedings, and it accordingly puts up with Nature to give up smiling for a while and put on a regular three ply frown the worst of it is, Nature always say "wid you," and then its "Hurrah, boys Phyllis. The first thing that she knows Nature lets up on the smile and begins to the deep villain, and sweet Phyllis finds the air suddenly filled with descending moisture but having no umbrella, she finds the air sure to be exceeding damp, so she accommodates a heavy move for the house, but don't do any good. Just about two minutes is enough to damage her grape box hat and all her crinoline fixings, and this just Phyllis depart from her pedestal. But when she gets home she makes things hum, y bet. She begins as soon as she strikes the house, by trying to pull all the bell wire in the street, and the moment she gets into the domestic atmosphere begins to take on a pinkish hue, and it stays so for some time.

course, Phyllis hadn't ought to mind a little thing like that, but still, it is rather aggravating to have your outfit spoiled when you haven't got the ducats for a duplicate. Don't you think so, Archie? Of course you do. If you didn't, we'd "tump you in der troat." You know we don't like to be contradicted. If we say that Christmas is the first day of spring, why, we expect you to believe it, and we really think, Archibald, that you would.

Perhaps, you don't know it, but it's just such kind of individuals as you that make spring even more rampageous than it would be otherwise. As soon as you see two or three blades of grass anywhere, you grab an army blanket and rush out into the woods to build one of your three cent spring odes. You hadn't ought to waste your time in that way, Archie. Those odes are so dry that the only thing that they are good for is to start the fire with; but still, we don't mind telling you how to fix things up so that they will be "O. K." hereafter. Just take some of your rejected odes and put in a few expressions like—"And he wore a boot leg for a hat;" "Oh, in the spring take anti-fat;" "Now you can bet your bombazine;" "For greasy spots apply benzine," and just hand in your little composition as a funny article and you will make money, in which case you will remit us fifty cents for the idea. But we wouldn't have you to understand that we attribute the whole of the rampageousness of spring to you, because we don't; for there is the inevitable seed agent, moving and house cleaning. The male portion of the household gets up in the morning and everything is as usual, but when he returns as the evening shades descend, he finds every carpet in the house ripped up and the whole concern wearing an aspect as forsaken as that of Hoboken, and the explanation is, "house cleaning." It has been found that house cleaning evokes more profanity per second than any other article on record, on account of the surplus of inverted tacks and unseen objects against which to bang the toes, and yet great reformers have never said a word against it. Strange, isn't it? Just say something about it in your next ode, and the practice will probably be stopped. As for moving, it is house cleaning with additional agonies, and the seed agent is considerably worse than either. He is so tough that no bouncer agoing can make any impression on him, and he seems to have an idea that all his seeds will sprout in the coal bin, if there is no other place for them, and

he can't be hired or forced to leave until he has convinced his victim that such is the case.

But, on the other hand, spring is desirable for some things. It yanks the verdure out of the stubborn earth and makes things look as though some one lived in the neighborhood; and it shoves into view the camellias, chrysanthemums and the maurandyas, and brings down the price of rose buds. And immediately the young man goes and "puts in" his overcoat and invests the capital thereof in a box of "Huyler's" and one dozen rose buds. And when the sun sinks low in the west, he goes straightway to the house of his best girl and presents them to her and gets the privilege of holding her on his lap the rest of the evening, and he has to spend the remainder of the week in sponging the spot off his shoulder. The aged man is relieved of the gout and gets the small pox instead, which relieves the monotony of his daily life and gives him the opportunity of looking as though he had been riddled with buck shot.

Spring makes the heart of the patent medicine man to thump his ribs for joy, and jump around the inside of his vest with an alacrity equal to that with which he would accept an invitation to take a beer. His heart goes through these capers because in the spring time people think that they are about to die, and so they rush off and spend about oufftie 9 dollars in bottled slops labelled "Sard's Hoopsparilla" or something like that, and the wealth just tumbles with a holiday jingle into the spacious pocket of the proprietor, and then he dances a large, heavy, double flip on the glass show case after he shuts up shop for the night.

Then the man who makes Easter cards always greets spring like a dear friend, because with spring comes Easter, and the youth and the maidens shell out their ducats for the festive Easter card; but verily, 'tis said, it is more often the youth than the maiden, because the maiden paints a rosebud with the mumps on one of her last year's cards, and sends it again to him that sent it, which makes things peculiarly interesting all around. But still the youths are plenty, and the card man is muchly elated like unto the medicine man.

And so spring goes; but if you want to know still more about it, Archie, just come up to the "sanctum" next summer and we'll warble you a little spring ditty with extensive variations. Now for fear that you might forget, even now, what spring is, we will make the

thing practically impossible, if you will remember the following little formula:

You may know that spring is with you when you feel its heavy clutch,
And you feel as though you'd eaten just a little bit too much;
And you hanker for vacation and the Sunday morning sleep,
And you clear the rubbish from the yard and pile it in a heap,
And you hire some Celtic bummer, whose heart is cold and hard,
To heave the heap of rubbish into your neighbor's yard.
But these are merely harbingers that tell of early spring,
But when it gets a firmer grip, it's quite another thing.
So, when the Irish fairy wets the sidewalk with the hose,
You may go right down to "Uncle's" and get out your summer clothes.

T. DINGUS KEHOE.

PHYSICAL CULTURE.

The first element of success for one who has wisely chosen his calling, is constitutional talent; or, in other words, he must be possessed of superior bodily stamina in order to impart warmth and vigor to his ideas. Till within a recent period, bodiculture, if it may be so called, has been neglected in this country; people everywhere have advocated the midnight oil for the young man, and our oracles of education have urged unsparing study. It has been truly said that the influence under which the young American, and especially the student of the past generation lived, taught him to despise the body while the mind was goaded by preternatural activity.

But now we are beginning to see that the body as well as the mind has rights which must be respected, and we are learning by bitter experiences, that if the mind, which rules the body, tramples on it, the slave will not forgive the offence, but rise up and smite the master. We now begin to see that the pale faced, sickly youth may take the prizes in college, but the man who has broad shoulders to bear the burdens of life takes the prizes that that offers.

Henry Ward Beecher, in an address before the students of Yale College, said, "That there is an organization which we call the nervous system in the human body, to which belong all the functions of emotions, intelligence and sensation, and that is intimately connected with the circulation of the blood and aeration of the lungs, that the manufacture of the blood is dependent on the stomach, so a man

is what he is, not in one part or another, but all over; and when a man thinks, he thinks his whole trunk through." In order that a man may do his work well, he must have a working constitution, and this can only be acquired by a requisite amount of bodily exercise. It is no exaggeration to say that health is a large ingredient of what the world calls talent. A man without it may indeed be a giant in intellect, but his deeds will be only those of a dwarf; on the other hand, if he has a quick circulation, a good digestion, and sinews in well developed condition, e'en though he have but a thimbleful of brains, will either stumble on success or set failure at defiance. A pound of energy with an ounce of talent, will achieve far greater works than a pound of talent and an ounce of energy. Intellect in a weak man is like gold in a spent swimmer's pocket.

The effect of the culture of the body is strikingly seen in the nations of antiquity, where gymnastics and calisthenics formed a part of one's regular school education, and with them we have an example of what great works can be executed by man when he has good, oxygenated blood flowing through his brain. It is told of Cicero that at one time in his life he was the victim of a train of diseases summed up in the word "dyspepsia"—maladies which pursue all overworked men as sharks follow the wake of a plague ship. The orator went not to physicians, but to Greece, where he flung himself into the gymnasium and submitted to its regimen for two years, and returned to his duties as vigorous as peasants that till the farm.

The success of those giants of antiquity, Aristotle and Plato, was due in a great measure to the harmonious education of the mind and body; no dyspepsia affected their stomachs, no neuralgia agonized their muscles, no philosopher's ails infected the throat with bad blood or ulcerated mucous membrane. Horace Mann says: "When I was in college I was taught all the motions of the planets, as carefully as though they were in danger of getting off their tracks, if I had not known how to trace their orbits, but of my own organization I was left in entire ignorance," and, as a consequence, he broke down in the second year of his college life, and never after enjoyed good health. Let men who are stripping for the race of life account no money as wasted which contributes in any way to build up our physical constitution.

We, as students, recognize these facts, and have put forth zealous efforts toward the es-

t of a gymnasium, and feel that if s and faculty would only look at it it we do, they would lend us their d the erection of a permanent gym-Stevens.

GRAPHICAL SKETCH OF JOSEPH SAXTON.

has produced *some* great scientists; e to say, this fact is continually over-our writers of text books, and the lent in this country naturally thinks oe is the only land where scientists h.

oks to the contrary, we have reason d of the work done in this country vancement of science, and among utors in this field there are names many of Europe's famous men in nent of a world wide reputation.

of Joseph Saxton stands promi-e first rank of scientific men, and we hort sketch of his life, written by Mayer. Its perusal should prove and instructive, especially to those ave supposed that some of Saxton's us discoveries were the result of or.

Saxton was born in Huntingdon, ia, in 1799. He was one of the ious inventors and skilful mechanics vast number which our country has o claim as her sons.

ge of twelve he began work in his l factory, and here first showed his enius by making a capital improve-e machinery in his father's shop. tly he was apprenticed to the village r, but his employer dying, he left village on the Juniata in a boat s own hands, and floated in it down rg; here he sold the boat for \$10, reakfast and a night's lodging, and is journey reached Philadelphia a ghteen years. Just before he left et with one of those accidents which hose who deserve them—turn the a mind into hitherto an unknown thought and action. One day, on o his rifle with the ramrod a ball h a greased patch, the ball sprang uch velocity, from the elasticity of d air, as to project the ramrod from Determined to drive the ball home, he end of the ramrod against a tree,

and giving a rush at it with the rifle, the ball went down, *but he also*; for the ball descended into the rifle so far and so rapidly that heat was evolved from the compressed air sufficient to project young Saxton at full length on the ground. Recovering his consciousness, he began to think of the cause of this remarkable explosion, and he reasoned that the air, when suddenly compressed, was like a nail when suddenly compressed by a blow of a hammer—they both being heated by the mechanical action on them. Subsequently, he found out that the reason which he had discovered for himself was that generally adopted in books on natural philosophy, and this fact gave him a reasonable confidence in his own reasoning powers and stimulated him to apply himself to the study and investigation of the actions of nature.

In Philadelphia he worked at watch making and engraving; and while there he, with the celebrated machinist, Isaac Lukens, made a clock for Independence Hall which, to this day, sounds the hours from the belfry of that historic building.

An insatiable desire to enlarge his knowledge of things and men made him live low and save his earnings, so that he might visit England. Reaching London, he placed his money in the care of a banking house, just in time to lose it by the failure of the bank. He awoke one morning to find himself dependent entirely on his own exertions, in the heart of that mighty city, without money and without friends. Driven to his own resources, he invented and constructed several ingenious mechanical toys, which had a great success at the Adelaide Gallery of Practical Science, then one of the most popular resorts of London. Here he met, among many of the eminent engineers and men of science, Telford, Brunel, Faraday and Wheatstone. With the latter he was associated as assistant in making the celebrated experiments on the velocity of electricity; indeed, he not only constructed the apparatus, but he actually worked it for Wheatstone in his experiments. How much of the success of Wheatstone was due to Saxton, I leave for those who are skilled experimenters to infer.

While in London he was the first, in 1833, to make a magneto electric machine, which exalted to such a power the magneto electric currents, recently discovered by Faraday, that his machine decomposed water and gave an electric light between charcoal points. Three years after this, in 1836, Clarke, of London,

merely changed the form of the instrument and claimed it as his own invention; but Faraday, Wheatstone and Daniell stated that Saxton's machine had been exhibited in 1833 before the British Association for the Advancement of Science, at its Cambridge meeting, and that he was the undoubted inventor. Yet, to this day, even in American text books, the machine is from *injurious* ignorance called Clarke's magneto electric machine.

Saxton was always fond of field sports, and in the course of his experiments in fire arms he invented the metallic cartridge now so extensively used in all armies. He failed, however, to patent this invention, which has been the source of great emolument to the owner of the patent right. Mr. Saxton was also, I believe, the first to apply a sighting telescope to the rifle.

While in London he made many inventions, among others the fountain pen, a water gauge for steam boilers, the reflecting comparator, the locomotive differential pulley described by Hawkins at the 1833 meeting of the British Association; also a method of determining the position of the magnetic poles in the interior of the earth. The results obtained by this method were subsequently found by the mathematical investigations of the celebrated Poisson, of France. He also made a machine which obtained electric currents from the earth's magnetism, and another which cut epicycloidal teeth for gearing.

While in London he was offered the responsible position of director of the printing machinery of the Bank of England. His ardent desire to return home prevented him from accepting this position. On the eve of his departure for his native land an entertainment was given him by several of the most eminent savans and engineers of London. At the dinner a work on mechanics was presented to him by John Isaac Hawkins, on the fly leaf of which is the following inscription:

"Presented April 26, 1837, by the editor, to Joseph Saxton, Esq., of Philadelphia, at a farewell dinner given to him in London, previous to his departure for America, by eighteen of his friends, as a token of the high estimation in which they hold him as a mechanician of the first rank and a man of science generally; in which estimation his fellow citizen, the editor, stands second to no one."

About the same time there appeared the following in one of the English journals of science: "Mr. Saxton, of Philadelphia, now in London, who is justly celebrated for his

acute feeling in regard to the nature of accuracy in mechanism, and who is not to be excelled by any man in America for exquisite nicety of work has made an instrument for cutting of wheels truly epicycloidal. Such a merit ought to be in the hands of an engineer."

Here we find Saxton about to return home, his character developed into and self reliance, and his mind enriched by the knowledge gathered in London and association with the first men of science and engineers of that day; and also holding them as a worthy fellow worker.

Thus we see Saxton "hoisted by his own petard"—the explosion of his rifle propelling him on high ground in London.

He reached Philadelphia in 1837, and made curator and constructor of the weighing apparatus of the United States. Here he made several notable inventions. We will only mention the perfection of Galloway's medal ruling machine, and a stove burning anthracite coal, provided with a automatic valve to regulate the draft. This was worked by an expansion of steam, whose action caused the stove to keep at an equal temperature.

In 1837 Mr. Saxton was awarded the Legacy Medal, by the Franklin Institute, for the invention of the "reflecting comparator."

This instrument is familiar to our readers and need not be described here.

Mr. Alex. D. Bache succeeded Mr. Saxton as superintendent of the United States Survey, and he at once placed Mr. Saxton in charge of the construction of the balances, weights and measures to be sent to each of the States for insuring uniformity of measures in all parts of the country. In Washington Mr. Saxton passed the remainder of his days, employing his talents in increasing accuracy and improved construction to the many refined instruments which aided in gaining for the United States Survey the high reputation which it has won in all nations.

Mr. Saxton had a manly and bold character. He was singularly modest to those who, like the writer, knew him intimately, did he give forth those suggestions and thoughts which showed his intellectual power. Mr. Saxton died deeply lamented by his friends, in Washington, on the 26th of September, 1873, after a lingering illness of paralysis. Professor Henry, in his

before the National Academy of Sciences (and from which these biographical facts have been chiefly obtained), says of

"He neither pestered the world with idle projects destined to failure because of necessary contemporaneous conditions of the present; nor retarded the advancement by advocating old errors in new forms. On the contrary, his innovations were founded on well established principles and consequently were positive additions to human power and efficiency."

ENGINEERING NOTES.

The English navy will be supplied with three monster guns, one of which is now under construction at Elswick. This gun weighs 110 tons, and have a carriage of 190 tons, making a total weight of 300 tons. The arrangements, therefore, will have to be made in almost every particular. The gun is a breech loader, having a bore of 16½ inches.

Its length is 43 feet 8 inches, with a diameter of 5 feet 6 inches at the breech, and tapers down to 2 feet 4 inches, with a diameter of 2 feet 6 inches at the muzzle. Preparations are being made for the proof trials, and when they are proved, the gun will be tested in its range and accuracy. It will be mounted on the gun barge "Magog," which is being altered for its reception, or it may be used to provide another vessel for it.

The Pennsylvania Company has met and overcome a serious obstacle in the bridging of the Schuylkill river. The bridge over that river is one and a quarter miles in length, and the trestle work over Garrett Island, is about midway in the river. Across the river to the west there will be one span 100 feet in length, at an elevation of 90 feet above high tide, and four deck spans of 100 feet each. Over the east channel there will be a through span of 380 feet, a deck span of the same length, and another deck span of 520 feet. Thus the distance across the river will be 6,300 feet. The approaches to the crossing over the island are of iron work, and the spans constituting the structure of the bridge will rest upon large piers and two massive abutments of masonry. The piers are built upon piles sunk by the pneumatic process to the bottom. At one of the piers the caisson will sink to within two inches of bed rock at

one point, when it was discovered that at other points within the area the rock was twelve feet lower. The whole structure, weighing over 6,000 tons, was held in suspension for two weeks, while the bed rock was laid bare at every point, and a concrete foundation built up from the rock to the working chamber in the caisson. The highest points of the bed rock were blasted off inside the caisson so skillfully that not the slightest damage was done. Work is still being carried on at the bridge.

Liquid fuel for locomotives seems to be employed with peculiar success on Russian railways. Mr. Urquhart, one of the most efficient railroad superintendents in that country, states, as the result of his experiments, that the naphtha refuse has a theoretical evaporative power of 16.2 pounds of water, and anthracite of 12.2 pounds, at 120 lbs. pressure per square inch; hence petroleum has, weight for weight, thirty-five per cent. higher evaporative power than anthracite. The liquid fuel is injected into the furnace in the form of a spray from the nozzle of an injector, by pressure of steam. To get up steam in one of these petroleum fed locomotives, the plan is to temporarily connect it to a shifting engine or stationary boiler, to obtain steam for the blower and spray jet. In lighting up, the spray nozzle is first cleaned of water by the steam jet, and at the same time the blower in the chimney is started for a few seconds to draw the gas, if any, out of the smoke box. A piece of cotton waste or a handful of lighted shavings is put into the combustion chamber, the spray turned on, the oil immediately igniting without an explosion. The petroleum is carried in a tank on the tender, the tank being provided with a gauge glass for indicating the supply of petroleum. For a six wheeled locomotive the capacity of the tank is three and a half tons of oil—a quantity sufficient for 250 miles with a train of 480 tons gross. At present 72 locomotives are running with petroleum firing; 10 of them are passenger engines, 17 are eight wheel and 45 six wheel connected freight engines.

The *Mechanical Engineer* of March 21, in "Lost Car Wheels," contains some curious facts about locomotives and cars running while one wheel was missing. In a note we have the following: "It has been established by the roller skate races in this city, that a man can travel 1,092 miles in 142 hours with 20 hours rest."

The Stevens Indicator.

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WE are again obliged to apologize for the lateness in the issuing of the present number of the paper. In former months it was our custom either to pass the matter over entirely, or to state that we had received no help from the college. This time our excuse is, that owing to the term examinations and the ensuing vacation, we have been unable to get our copy into proper shape for the printer. We think that the novelty (for us) of this excuse will cause our readers to pardon this, our first offence under the new organization.

THE suggestion contained in the communication from a Junior struck us as being most excellent. The benefit derived from the recitations in Thorpe is decidedly a negative one, and it is strange that other classes have not taken the initiative in attempting some improvement. The time allotted to laboratory work is not sufficient, as the professor of the department himself acknowledges, and it seems to us that the roster could be so altered as to give the Juniors their recitation hours for practical work instead of in "day dreams."

COMMUNICATIONS.

CHEMISTRY RECITATIONS VS. TIME.

To the Editors of the INDICATOR :

It is a universally acknowledged fact that newspapers are merely mouthpieces of public opinion; similarly it may be alleged with propriety that your excellent journal is the expression of our prevalent college opinion. For that reason I submit to you for publication my statement of a grievance, knowing, as I do, that it is endorsed by all my classmates.

In a course like ours we need every moment not only for the conscientious study of lesson but also for the acquirement of additional technical knowledge by a perusal of periodicals, special books of reference, examination of models, machine shops, etc., in the neighborhood. Besides this, a reasonable amount of literary reading should be done by every man who desires to be a little more than a one-sided M. E. Now every obligatory study, which has neither an intrinsic nor an extrinsic value, and which in addition takes up considerable time, apparently for the sole purpose of being invariably forgotten after the recitation is over, is positively detrimental beyond a doubt. Of such a nature do we Juniors claim to be our present lessons in Thorpe's Quantitative Chemical Analysis. In our practical work in the laboratory we are naturally allowed to use the text book; for what earthly reason are we then required to remember for one day only a number of scattered facts, which we are sure will "mix thoroughly and evaporate to dryness?" Would any one, except an expert, trust to his memory for the method of examining exactly, in actual practice, any substance whatsoever?

If, indeed, we were expected to learn by heart the way Prof. Thorpe analyzes a sample of iron or steel, it might do us some good; instead of that, powdered glass, potassium, salts, and the like, are thought to be fit subjects of investigation for the embryo M. E.

The professor has been heard to say, that he wishes to be sure we read over the text. If that be the case, is there no other way of discovering this than by asking a poor Junior to describe the minutiae of a complete analysis?

How soon have we not forgotten our Shaw, studied, as it was, without interest and understanding! Far better it would have been had we read the authors themselves, using Shaw merely as a guide in our travels through Eng-

ture. But that is a thing of the past. Let the Sophomores and Freshmen take care of themselves.

In conclusion, I beg to remark, that it is the duty of an education to teach a man where to find any information he desires to find, and not in the remembering of the details themselves. Such information is indeed an accident, while at the same time it is the purpose of true education.

It is my hope that this communication will be more effective than its various predecessors in columns on the "Gymnasium," the study of Political Economy," the "College Pin,"

Yours respectfully,

A JUNIOR.

A CORRECTION.

Editors of the INDICATOR :

The note of last month appended to the Electrical Nomenclature was written under a mistaken idea, and was not the system the article referred to. The communication by Mr. Nystrom on the subject will be published in *Mechanics* for December and January. In that system, the electrical units are all equal to or some decimal multiple of any units now in use, and the whole system is mutually convertible by means of *mulæ*.

R.

THE GLEE CLUB CONCERT.

The Glee Club gave its first concert Thursday evening, March 19. This was the first appearance of the club for many years, and it was a grand success, so much so that the members have been completed to repeat the entertainment. The programme included numbers, each of which was enthusiastically received by a large audience, made up entirely of the personal friends of the members of the Glee Club, which aided, still making the evening's entertainment the most enjoyable during the season. One of the evening was Miss Dunn, of New York, who gave "Marguerite so Fair," and "Yes so Blue," in the first part, and an encore, in the second.

The Glee Club deserves the lion's share of credit for its part in the performance, the programme being all well chosen and admirably

rendered. Mr. Camp, the leader, has succeeded, with the excellent material at his disposal, in making this Glee Club the superior of any that have sung at Stevens. Many of the selections were encored, the audience not failing to show their appreciation of the club's efforts. Mr. Brainard's ('84) warbling and Mr. Post's ('74) cornet solo were features of the evening.

"George Washington" visibly affected the patriotic audience and was received with rounds of applause. The mournfully solemn song, the "Bold Fisherman," in which the solo part was taken by Mr. Hart ('87), also seemed to find favor with the audience, and had to be repeated.

Messrs. Johnson and Horn, in their banjo duets, completely captivated every one, as the encores bore testimony. Their playing was perfection, and received a perfect ovation. The Institute Banjo Club did their part well, and were very effective in their accompaniments to several of the glees.

After the concert the floor was cleared for dancing, as a wind up of the entertainment.

THE COLLEGE PIN.



We take pleasure in placing before our readers a cut of the new college pin. After a great deal of discussion, this design was chosen, and has already become a familiar object to the students and Hobokenites. It is made up of two kinds of gold, with a jewel placed either in the headlight or the boiler front, according to preference. It is not our purpose to criticise the pin, as the matter has been settled, and anything that may now be said adds only to the dissatisfaction of the few who opposed the design.

However, THE INDICATOR congratulates itself and the college that the idea of a college pin has at last been acted upon. We believe that every Freshman class for ten years back has advocated such a scheme; but it has remained for '88 to awaken sufficient enthusiasm among the higher classes to result in the choice of such a pin. This year was also very

favorable for such a scheme, as there were two classes without any pin. We hope that this design will find favor with our Alumni, as it has with most of the students. The price is not so exorbitant as to debar a student from purchasing a pin, if he so desires—and we earnestly hope that he will so desire.

We also take occasion to thank the Seniors for the utter indifference displayed by them during the entire discussion. It is not amiss to state here that they came up and voted at the last college meeting, as upon a matter of vital importance to them. Perhaps they considered the subject too trivial for them to argue about. However, we do not care about that now. One of the many objects for which THE INDICATOR was brought into existence has passed away. It now remains for us to turn our attention to the gymnasium agitation. Yes; we at Stevens are progressing.

COLLEGE PIN COMMITTEE.

'86.

C. J. FIELD, *Chairman*.
WM. S. CHESTER, JAMES S. MERRITT.

'87.

M. C. BEARD, WM. F. D. CRANE,
THEO. THEBERATH.

'88.

L. L. EPPINGER, A. R. KOLB,
HUBERT S. WYNKOOP.

IMPORTANT.

SENIOR PROMENADE.

Until last year commencement at the Institute was a very democratic affair. The exercises occupied only one day, and usually consisted, beside the graduation exercises proper, held usually in the hall of the German Club, of a meeting and banquet of the Alumni Association, and a reception at President Morton's. Last year the graduating class extended the programme so that it lasted four or five days, and made many improvements, so that it became more nearly like similar events at other colleges.

This year the Seniors are making extended preparations for commencement week, and hope, if possible, to improve on the past year's programme. In order to make the week a

successful one, it is necessary to have something each day, so that the programme be a continuous one. For several years modest attempts have been made to have something during the exercises. This year they have taken up the project again, and have placed the task of making all the arrangements in the hands of a committee of seven. The Senior Promenade is to occur on June 1st, and through the kindness of the members of the German Club, the hall connected with the building has been secured, and is intended to be an affair which shall be honorable in the history of similar events. The hall will be decorated in an elegant manner for the occasion. Flowers, plants, and draperies will lend picturesqueness and beauty to the scene, and sweet music will be furnished by a large orchestra. The refreshments will be served by the regular club caterers. The tickets will be instructed to spare no expenses. The programmes are to be engraved in the style of the art, and are to be so arranged as to form an appropriate souvenir of the occasion.

In order to make the ball a success it is necessary that the committee have the cooperation of the entire college, and of the alumni, and they feel safe in relying on the sympathy which has never yet been wanting in enterprises involving the reputation of the college as this does, to furnish substance to the project. The tickets have been sold at a low price, and admit gentlemen to everything without extra charge. They may be procured from the members of the committee, or from any member of the class.

HIGH SCHOOL NOTES.

Prof. Sevenoak is said to have caught the Princeton College nine for several years.

"88" has lowered herself in the eyes of the community by taking—"hooking"—a base ball bat belonging to the "Prep."

The members of the 4th class have been studying physiology this year. They seemed most interested in the study of calves' brains, and after the close of the year 54 hands wandered unconsciously toward the cerebellum, and finding the little brain in position, 27 grins o'erspread 27 Prep.

The High School expects to have a new lent base ball team this year, although the last year's team have left.

average age of the two highest classes High School is 17 years. The average of the two lowest classes could not be ascertained, as some of the members had not yet begun to speak, and those who could did not but referred us to their nurses.

ed. — Competent nurses for Prof. Stevens's Kindergarten.



March 13 was organized the "Metro-Amateur Lacrosse Association," comprising in its membership four clubs, viz.: the New York Lacrosse Club, New York University, Williamsburgh Athletic Club and Stevens.

constitution was adopted and officers elected as follows:

President—J. R. FLANNERY, Williamsburgh.
 President—E. J. COOK, - Stevens.
 Treas.—J. C. GERNDT, N. Y. L. C.

Directors:

MATTHEWS, - - - - - N. Y. U.
 MARTIN, - - - - - Williamsburgh.
 SON, - - - - - N. Y. L. C.
 J. R. NORRIS, - - - - - Stevens.

These seven men form a Board of Directors.

It is to be an annual convention composed of the above directors and two delegates from each club, each man to have one vote. This convention, which meets the first week in April, arranges the schedule of games to be played, decides upon a trophy and settles all disputed points which may be brought up.

Matches are to be played on inclosed grounds, two thirds of the gate receipts to go to the home club.

The meeting of the "Metropolitan Amateur Lacrosse Association," held at the Knickerbocker Club Cottage, New York City, April 1st, were present, J. R. Flannery, of the Williamsburgh team, and President of the Association; Mr. Gerndt, of the New York Lacrosse Club, and Secretary and Treasurer of

the Association; Vice President, E. J. Cook, and E. G. Coldewey, of Stevens; Mr. Roberts, of New York University.

The business of the meeting was the arrangement of schedule of games to be played this spring, of which the following is the list:

April 28—Stevens vs. N. Y. University, - at Brooklyn.
 May 2—Stevens vs. N. Y. Lacrosse Club, at Brooklyn.
 " 7—N. Y. University vs. Stevens, - at Hoboken.
 " 9—Williamsburgh vs. N. Y. University, at Brooklyn.
 " 13—Stevens vs. Williamsburgh, - at Williamsburgh.
 " 16—Williamsburgh vs. N. Y. Lacrosse Club, - at Brooklyn.
 " 21—N. Y. Lacrosse Club vs. Stevens, at Hoboken.
 " 23—N. Y. Lacrosse Club vs. Williamsburgh, - at Williamsburgh.
 " 28—Williamsburgh vs. Stevens, - at Hoboken.
 " 30—Tournament, - - - - -
 June 6—N. Y. University vs. Williamsburgh, - at Williamsburgh.
 " 13—N. Y. Lacrosse Club vs. N. Y. University, - at Brooklyn.
 " 20—N. Y. University vs. N. Y. Lacrosse Club, - at Brooklyn.

Our Lacrosse team have arranged a game with the Druids, at Baltimore, on May 16.

The following dates have been arranged for base ball games:

April 18—Watsessing, - - - Hoboken.
 " 22—Columbia, - - - Hoboken.
 " 25—Jersey Blues, - - - Hoboken.
 May 2—Troy Polytechnic, - Troy.

Although the score of Saturday's game showed a majority (11 to 7) in favor of the Watsessing team, Stevens displayed a much better form. At the bat, the Watsessing scored 9 base hits, while Stevens, 11. The errors are a tie, but in earned runs we are far ahead. The pitching was "wild" in the first innings, and to this can be attributed the loss of the game, as 7 runs were then made. For the first game, all acknowledge that Stevens is to be congratulated; but, it is hoped, next time, members of the team who cannot play will notify the captain of that fact, so the team will not be inconvenienced.

The Spring Athletic Games are to take place Thursday, May 14th. Entries close on 11th inst. There are to be sixteen events, including the tug of war.

The committee earnestly requests the students to take an active interest in this matter, and to go into training at once for the various events. The prizes are to consist of medals.

PERSONALS.

The following Stevens men are now at the New Orleans World's Exhibition :

'77.

HORNBLOWER ; with J. & P. Coates' Thread Factory.

'80.

G. W. BOND ; in charge of Pratt & Whitney exhibit.

'83.

L. M. HERNEY ; with Linde, Smith & Co., New York, Ice Machinery.

'84.

R. L. FEARN, in charge of Graydon & Denton, the Atlanta Engineering Co.

L. D. and W. CARROLL, in the office of the Superintendent of Machinery.



Examination is *past*.

Have you *passed*?

Cribs for sale by the million. Apply to the class above yours.

Chambers Street clothing dealers boast that they can *suit* anybody.

Order your college pin at Newman's *now*, before the rush sets in.

Juniors are referred to *Clerk*, '85, for an explanation of *counter-efficiency*.

Remember the Glee Club concert in Brooklyn, on Wednesday evening, May 13.

A Champagne Tap is the subject of a spirited Freshman's examination drawing.

The Juniors are complaining that the examination in kinematics has been too easy.

Prof. in chemistry: "Then—er—a you add some—er — — — Ev-r—"

"My kingdom for a—pony!" was a Junior fetched before Prof. Woo ination.

Prof. of Physics: "What is velocity?" Funny student: "Velocity is what sets a hot plate down with."

Prof.: "What metal dissolves bromine?" Student: "Nitric acid." (Laughter) Prof. (amazed and puzzled): "The"

Our worthy janitor has remonstrated with our stuffing him into the *Stuffing* time. We have listened to his prayer and spared.

Spring has come. Hoboken saloons display their tempting bock beer sign. A cheap spring chicken is within reach of the landlady, and baseball practice has begun.

The third and last term has come. It is a fact well worth consideration that a *paratively* few (?) new text books are published. The only man in Hoboken that is *no* with this is Mr. Luthin.

Have you a camera, a banjo or a 'What! behind the age? Hurry up then, one or all, if you wish to be counted of Stevens' sons. They are at present in fashion than the *College Pin*.

A student, in the last examination, given a number of problems, one of which was an original one. He thus tersely said: "Professor, I have *never* seen this before." His horizon was contracted.

Prof. MacCord's "Paradox:" If the starting point of a curve *move*, at any point in one direction at the same rate with *moves* in the opposite direction, it will still and will consequently *move* peculiarly to that direction.

The Professor of Engineering gave the students to omit the covers for examination. One of the men interpreted this literally, tearing the *showy* red cover off and brought the latter in his inside coat for examination. *O, tempora! O, more*

Is it at all characteristic of the professors to move the chairs in the chemical lecture room?

nly ones that are fastened to the floor? In lucidation of this point it must be considered that the Prof.'s high seat, the only loose one, is found at times lying on its belly in the back of the room.

Upward of one hundred and thirty dollars, outside of previous expenses, were realized by the Glee Club. All expenses lie. The B. M. consequently did not find it worth while to go to Canada. He has been re-elected, and will probably get another chance. False alarm! He has resigned.

Prof. Leeds advised the Juniors to write out "schemes" of the various analyses treated of in Thorpe, in order to learn the lesson the better. One of the students complained that "that was all right; only the Prof. don't call us up to the board where we can make use of those 'schemes.'"

George, having received several ovations at the concert, has conceived the idea that the public is "crushed" on his shape, and he is accordingly contemplating the study of the drama in an oyster saloon. After having completed his education in this direction, he will probably star in one of Harrigan & Hart's productions.

The Glee Club will probably give several concerts this season. Brooklyn, Orange, and various other places are under consideration. They will sing at the Hoboken High School entertainment, at the concert of the Athletic Association, and various other occasions. Though young, it has shown itself well worthy of all emulation.

Prof. (with every evidence of one who is conversant with natural philosophy): "The water reservoir was covered with a perfectly green scum, and such was the greenness of this scum, I have not the least doubt that if a verdant cow had chanced that way, *he* would have stopped to *graze*, I'm sure." And the class smiled some.

Student in the chemical laboratory, after vainly trying to adjust some apparatus, leaves in disgust. Interview, some time after, with the professor, who had meanwhile set the unruly machine:

Student: "I didn't leave it that way. Some D. F. has been fooling with it."

Prof. (blandly): "Then I must be a D. F."

In several New York business places the following sign is posted in a conspicuous place:

"A word to the *wise* is sufficient. We do like the smell of a good cigar, but we detest cigarettes." Reconcile this with the statement of medical men, that "cigarette smoking leads to *idiocy*." Would it apply to Stevens men?

The students of the *Stevens Institute of Technology* do not cheat; they only crib and skin. Talking about skinning, a fellow the other day remarked, while under the hands of a knight of the lather box: "If you call this *skinning*, it is not so bad; but if you call it *shaving*, I should prefer to have you take the other side of your razor." It was no Stevens man, because they all *skin* themselves.

Temptation was too strong for Mr. Dilworth. He has resigned his office of Chancellor of Exchequer of the Glee Club, amid the heart-rending lamentations of the grateful members. Mr. Field, '86, the proverbial business man of the college, has been elected in Mr. D.'s place. It is to be expected that the young club will prosper under the new director, as it has heretofore under the able management of Mr. D.

Group about the large magnet. Professor (endeavoring to magnetize a file presented by a student, with indifferent success): "Gentlemen, this is strange. I—have—*ugh*—a—*ugh*—magnetized a great many files, but never—*ugh*—found one so obstinate." But his recollection suddenly coming to his aid, his face brightens and he inquires: "Is this one of Hawkrige's files? Well, that solves the mystery." File is retired and labelled N. G.

What is this place? It is the foundry. What do they do here? In summer they perspire, and in winter contract pneumonia. Why do they do that last? All on account of the fresh blacksmiths. Is the temperature so fresh here in winter that people catch cold? Not usually; but the frisky blacksmith delights in heaping his forge up with green coal, thereby causing it to give out dense volumes of smoke which remind one of the "gentleman's cabin" of the Weehawken. The windows of the inferno are opened, and the sulphurous smoke gives place to Hoboken air containing all the modern improvements at a temperature of 6° Fahr. Oh—h!

Yea, verily! on May 13 the Hoboken student will gird up his loins and hie himself hence to the City of Churches, and after making the necessary preliminary negotiations with the bull pup and the patent "Bogardus bouncer" door mat, will take his best "gyurl" to the Glee Club's concert, where he will endeavor to catch fifty cents' worth of melody floating in the air, in spite of the person back of him who insists in talking, a nervous woman in front with a big hat, and a boy at his side who is continually falling asleep and falling over on him. Verily, those who miss it will be yclept Dennis. Selah!

We overheard the following quarrel in New York City, between two laborers, an Englishman and an Irishman, in which the latter distinguished himself by his ready repartee:

"You're a fool," observed John.

"'Tis all owin' to my being along with you, an' it's a catching complaint," retorted Pat.

"I hope the first time you mount a ladder you'll break your neck," returned the Englishman.

"If I do, it will save me the expense of keeping a holiday when your neck is broken for the public good," rejoined the Irishman.

"I wish every Irishman in New York was transported to Madagascar," cried John.

"Then you might put up a board and advertise the city to let," answered Pat, and so the dispute ended.

At the regular meeting of '88, a new treasurer was elected, and the programme was fully as interesting as a real four-lunged boiler explosion. Deacon Whaley spoke at some length upon the lop sided activity of collegiate deacons in general, and upon the narcotic effect of profanity on the nervous system. From his remarks it appeared as though he was hopping along the "straight and narrow way," as usual; but a report was circulated that he had fallen into the habit of mixing up blue cuss words with his daily avocations, and also of doubting the dimensions of the ark. The charges were accordingly brought against him, and as he was unable to refute them, he was kicked out of the deaconship by a two thirds vote, as his abilities were believed to lie in another direction. He was appointed Lord High Guardian of the Overshoes, with an annual stipend of two gum drops. Those who have heretofore known him as "Deak" or "Deacon" will hereafter recognize him as "Gummy."



FATE.

Student gehen zu dem Lecture
Mit sein Fraulein, ein Bon ton,
Student has on glazened laundry
Noch nicht paid for zu Herr Kahn.

Als sie treten Walnut Strasse
Wen der sprecher durch had got,
Madschen sees a Sign von Oysters
Points zu Restaurant der Rott.

Student zittert, fuhlend pockets,
Es gibt da nur Cents funf-zehn,
"Fear Sie nicht, Lieb das dein Mutter
Wunschet sie nach Haus zu gehen?"

"Ich will risk it," sprach das Madschen,
Als she turned him zur der Thur
Fur ich weis das you'll not like it
Ess' ich Oysters nicht mit dir.

Zuruck gehen nicht he konnte
So betet Oysters stewed their best
Aber konnt' nicht eat mit pleasure,
Bankrupt for Sauce will nicht digest.

So bald es komt the Tug of Krieg
Wenn sie aufstehen zu go away,
Er winkt nach Mann behind the desk
Meaning "Bezahl another day."

Der Mann rief aus: "O donner blitz,
Denk' dose vinks are pey for you?
Du has vinked me now funf Dollars—
Oysters, ice cream and do-loo."

Student stammered, yammerend loudly,
He had left sein Purse zu heim.
Aber had to pawn der Time piece
He had borrowed zu look fine.

* * * * *
Als der Student Home spazieret
Er war troubled in his Mind
"Sind Madschen mit den Oysters besser
Dann zu gehen all allein?" —Ex.

Why is a Freshman like a telescope? Because he is easily drawn out, easily set through and easily shut up.

Why is a Sophomore like a microscope? Because when seen through, small things are revealed.

Why is a Junior like a kaleidoscope? Because every time you look at him you perceive some new beauty.

Why is a Senior like a spectroscope! Give it up.—*Queen's College Journal*.

That last's wrong; because he spectrally scoops all the girls in at Commencement.

* THE *

Stevens Indicator

Vol. 2.

* May, 1885. *

No. 5.

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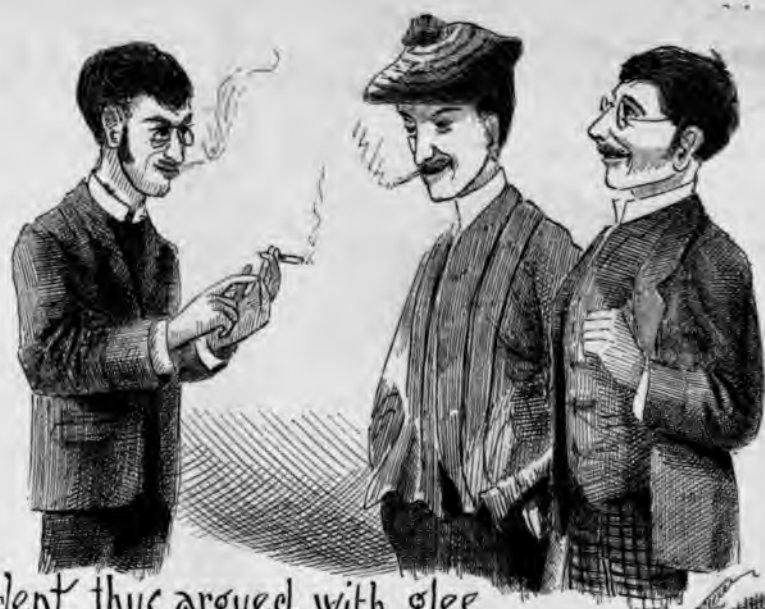
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A student thus argued with glee
"A crib is a written skin, see?
To crib is to write
What's right is not wrong
Hence, to crib is not wrong Q.E.D."



T H E

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HOBOKEN, N. J., MAY, 1885.

No. 5.

UPON WHAT DOES SUCCESS IN LIFE DEPEND?

As we survey the kaleidoscopic fragments of our civilization, our attention is arrested by the different attitudes of individuals toward success. To the merchant success means wealth; to the ambitious man it means honor, and talent recognized; while to the good man the term is synonymous with the power to do good, allied with both wealth and honor. Indeed, in the last case success depends in a great degree upon the two former; for a man may desire to benefit his fellow creatures, and unless he has wealth or talent in a greater or less degree, he will accomplish practically nothing. It being the case that there are many ways of regarding the term success, it behooves us, as those who are trying to live in accordance with the eternal order of our existence, to look into this matter with a view to ascertaining in what true success consists.

It is readily admitted that success is primarily the accomplishment of a purpose. Purpose, then, is the foundation of success; for how could success be attained without some definite object in view? or, on the other hand, upon what grounds could one excuse himself for planning for the future if the possibility of success were not admitted? An American divine has embodied the truth in these words: "Purpose is the eternal condition of success." "There is no road to success but through a strong, clear purpose." The purpose may change, but that does not insure the overthrow of success. Still more; this purpose should be carefully and deliberately chosen. Each individual has some special fitness for one or another branch of the world's work. His purpose should naturally be allowed to take this direction. Not that it is advisable to confine one's self too closely to one thing. I do not believe that it was intended that we should cultivate one faculty at the expense of another; but only so long as all the faculties are exercised, though not to an equal degree, is the law of our being carried out. If it were not so, why

did Solomon, after stating that "there is a time for every purpose under the sun," so carefully enumerate? Was it not in order to emphasize the divine plan in which "everything has a season"?

But while I have dwelt upon purpose as a principle of success, I do not forget that we may go further, and find a principle which underlies both purpose and success. As I have briefly hinted, lying back of purpose must be faith in self, the belief in one's ability to accomplish certain purposed results. It is idle for a man to build castles in the air, or, as it were, think to build his house from the roof downward; but if, along with the plan, there is faith, then practical results will ensue.

Now, indeed, it would seem at first blush as if we had noted all the points essential to the consideration of the underlying principles of success. It does not necessarily follow, because success is sometimes attained without a certain factor, that this factor is not necessary. Therefore, we must not overlook a very important, and oftentimes disregarded element, which in certain kinds of success plays the most active part. I affirm that in all true success, faith in a Creator is an absolute and fundamental requirement. A man who has no faith in such a being puts little or no trust in his fellow man; and, after continuing on in such a moral condition for a time, he finally loses faith in himself. Such a one is a sceptic, and a sceptic is a forlorn creature, entirely out of keeping with this world of ours.

I am now ready to answer the question, In what does true success consist? True success is the accomplishment of a purpose, not our own, but put into our hearts by One infinitely wiser than we; which purpose is upheld by faith in our ability to approach to the required result.

Must not this success, therefore, be far above those results which the world terms success? And above all, is it not our duty to remember that there are many others, young people, entering upon life purposeless, and needing our example and advice to cause them to realize their individual purposes? I

fear that our purposes are not so strong, not so absorbing as they should be.

True success, then, requires the possession of a purpose, of faith in the ability to accomplish it; and belief in the inspiration of that purpose by the Creator. If these conditions are fulfilled, success, not, perhaps, as the world deems such, but success as regarded under the clear light of the highest moral standard, is certain.

C.

HOBOKEN EGGS.

Edward Atkinson, the Boston statistician, estimates that the annual product of our silver mines is not equal in value to the annual production of the hens' eggs in the United States. We believe you, Mr. Atkinson, we believe you.

From our own experience we can truly say that, were we to depend wholly on the products of *our* mines for our subsistence, we would have been totally obliterated from this mundane sphere years ago, from their sheer lack of strength. But the eggs, whew!

For pure, unadulterated Samsonian strength, give us a genuine Hoboken boarding house egg, and we'll warrant you that it will stand by you longer, and put more strength into your determination to be "up and doing," than a whole bank full of trade dollars.

The field of usefulness for the fruit of the Hoboken hen seems to be unlimited; and from latest accounts we learn that Mr. Whitney, our new Secretary of the Navy, has decided to use them hereafter on board all the United States gunboats, thus doing away with the more expensive shells and torpedoes.

They can be used raw or boiled, hard or soft; can be thrown a distance of from twelve to fifteen miles, and penetrate the heaviest armor.

As boiling destroys their power to some extent, if it is desired to completely annihilate the enemy they should be left raw; but, if the object is to secure prisoners, then they should be boiled quite hard. If this is done, the odor which pervades the atmosphere on the bursting of one renders the men insensible, when they can be easily captured.

This is a great step in the interest of humanity, for of late years the object seems to have been to kill as many as possible. Large orders are now pouring in from all the great European powers, they fully recognizing

their merits, and when once the war cloud breaks, the effect produced by these new engines of destruction will be terrible. But, deadly as their power is when exploded, they are used with impunity by our boarding houses, because of their wonderful ability to appease hunger. We have known a whole house full of hungry students to have their cravings immediately satisfied by one whiff of this nutritious food; refusing, for the rest of the day, all those choice viands that only Hoboken can furnish. Indeed, so highly is this fruit valued, and so fully are the merits of the bird recognized, that the fond mothers of this town are naming their offspring after it, and the *Henerys* are now far in excess of the *Jacobs* or any other name formerly common to this locality; thus proving the wisdom of their sex in placing their boys early in life on the winning side.

Now these are facts that pertain only to the Hoboken bird, and we mention them because Mr. Atkinson may have unintentionally wronged this fowl by classing its production among the common kind, and because, by bringing this wonderful egg before the public, we strengthen, with their unapproachable strength, the statement made by that gentleman, and thus aid in giving the Shanghai berry its true value.

J. M.

A VISIT TO THE INDICATOR SANCTUM.

The readers of the *INDICATOR* who enjoy a monthly feast on the literary treat practically given away at \$1.50 per year (invariably in advance) may have felt a desire to pay a visit to the fountain head of this marvellous flow, to breathe for an instant an atmosphere in which there must be inspiration, and gaze on the editor in his haunts and engaged in actual labor. We know just how it is; we often felt so ourselves before we became great, and we are now going to take you in imagination through the sanctum and introduce you to the *literati* themselves.

Having ascended a long flight of stairs—for the *INDICATOR* occupies an exalted position in the world—we find ourselves at a glass door, and here we must tarry a while, for within is a battalion of Preps receiving their instruction. Faintly through the door comes the sound of their baby prattle. Pretty soon they finish, and the hall way echoes with the patter of little feet as they descend the stairs to the door way where they are tucked into

ulators, and trundled around the park
iring. How happy and innocent they
God bless the little toddlers!

ome, let us go in. Passing through a
om we reach a small, richly carved
oor way, surrounded by a sculptured
nd you instinctively feel that you are
he holy of holies. Look out!! Don't!

My dear sir, my blood runs cold to
f the horrible consequences which
ave followed had I not in time pre-
you from opening that door! What
ave happened? You shall see in a

. I knock in a peculiar manner, thus:
o—one, two. Just listen to that sav-
el! Do you hear that peculiar scratch?
by the same, and a swarthy face and
d head is thrust through the door way.
dallah! chain up Cerberus and muzzle
all right, now step inside. You may
m pale to see the danger which you
caped! Had you opened that door
eenth of an inch, that howitzer facing
r would have perforated you with sev-
nds of nails and old iron, while at the
stant a trap door would have opened
feet, and your downward progress
y a weight of several tons falling on
ead from above. You would have
rough a dark shaft into the sewer, and
ept by its raging current into the river,
newspapers would announce another
ous disappearance. Should the com-
by any accident fail to work, our dog,
s, and the athletic editor would finish

Yes, it does seem somewhat cruel,
privacy of the sanctum must be pre-
and as you perceive, we treat all men
ies until we know them to be other-

come, let us get acquainted. This
andsome man, with the head of a
r a Vanderbilt, is our business man-
He rises and salutes us with the grace
esterfield; his business is to solicit ads.
le, melancholy man is our exchange

His work makes him tired. He is a
ed hypochondriac, and is rapidly wear-
under his trying duties; but if he
lear of the funny columns, he may
t a year or so yet. That large, power-
with stacks of muscles adorning his
arms is our athletic editor. He and
s, Cerberus, constitute our standing
They both accompany the business
when he goes out to collect bills;
also act, as already stated, as a re-

serve force, in case the combination doesn't
get in its work. This gentleman with such a
large depression in his head in the region of
the bump of veracity is our local editor. It
is his business to inv—— I mean collect col-
lege items. He has received numerous flatter-
ing offers from Barnum and the Russian
government, both of whom would gladly
secure his talent, but he remains faithful to
the INDICATOR staff. The remaining gentle-
men are mostly stockholders. They occupy
their time, when not engaged in writing for
the paper, in looking up places of investment
for their dividends. They, with our special
correspondents and stenographers, complete
the staff.

But, pray, don't be in a hurry. Recline a
little while on this silken divan and rest your-
self. Abdallah, some refreshment! While we
are awaiting its arrival, let us look at some of
the curiosities. Here in this drawer right by
us are some mournful relics. This golden
curl once waved over the brow of a Freshman
who attempted to enter the sanctum while the
combination was turned on. Sad to relate,
we afterward found out that he was coming in
to pay a subscription; but the trap door,
weight and howitzer didn't know that, and the
young unfortunate went into the lower story.
This necklace of pearly bicuspeds and molars
is one of the numerous trophies that the ath-
letic editor hangs at his belt. They once
adorned the mouth of an athletic Soph, who
became offended at us for something in the
paper, and undertook to give us points in re-
gard to running it; but he paid for his temer-
ity with his teeth.

But let us turn away from these, and con-
template something more pleasing. Ah! here
comes a slave bearing a delicate refection of
sherbet and pickled clams. Be seated and
partake of it, and meanwhile let us look at
the pictures, bric-a-brac and elegant little
articles of *vertu* scattered in graceful disorder
around the room. That large picture hanging
over the ebony and gold *etagere* is by Raphael,
and is entitled, "A scene on the Morris Canal."
It is supposed to be his last work, and was
picked up by our art editor in an antique col-
lection on the Bowery. Although the price de-
manded was fabulous, it was unanimously
decided that it must be purchased at any cost.
It costs us, including frame and cartage,
\$7.50, and is regarded as a great prize. How
natural is the delineation of that mule, as with
his off hind foot he gently heaves the gondo-
lier toward the north star!

That large portrait hanging over the grand piano is by Meissonier. It was secured through a friend, and so was obtained at a ridiculously low price, but the art editor wouldn't look at an offer of five dollars! These rugs were imported for us directly from Turkey by our particular friend, Mr. Goldstein, of Chatham Street, and every piece of furniture is, as you perceive, in keeping with the general elegance of the establishment.

What, must you go? Well, we hope that you have enjoyed yourself, and any time that you wish to pay us another visit, we shall be glad to entertain you. Notify us in advance, and we will have the combination turned off and a muzzle on Cerberus. Good morning, sir; good morning.

CHEAP "LITERATURE."

Great as is the benefit conferred upon mankind by the press, still much evil is done by a too great freedom of its power. Perhaps one of the greatest is that which results from the enormous quantity of worthless literature that is issued every year. One must deplore the wide circulation that this trash has attained among the readers of this country, for however much we may pride ourselves on being a nation of readers, it is to be regretted that such poor quality should find so ready a sale. Go where you will, these miserable papers meet your eye; on the corner stands, in the news rooms, hung in the most conspicuous places, where their pictures or flashy headings may catch the eye, and thus act as a bait for the unwary, who are too often caught in the trap.

If you could station yourself in one of these places, you would be surprised at the number of intelligent persons that buy this truck, or at the number of young children sent by thoughtless parents, and who, childlike, search eagerly for the pictures, thus laying a foundation for a task that often lasts through life; for this is a most powerful way of conveying ideas. Again, most of you have seen men standing in prominent places, distributing copies of these papers, and if you have watched with some care, you must have been struck with the pains they took to place them in the hands of those whom they thought likely to read them. Having a desire to know what they contained, I procured one, and will give you a brief account of what I found in it. On the first page was the picture

of a room, in which stood a cross-eyed man with clasped hands and her head thrown at an angle of forty-five degrees. I could tell whether this was an attitude of supplication, but before her stood a 'man' of the deepest dye," with clinched fists and scowling eyebrows that almost met his while underneath the whole were the following words: "Marry me you will, though it be through the blood of Henry Harvey to you!"

I don't know whether Harvey had a plus blood or not; but if he had, I think he would have objected, as no man cares to be another trotting through his blood. You can't blame him.

On page number two, I found another picture. This represented a cliff near which was a tree, and on it (the cliff) stood a girl, with arms stretched out toward a black patch of ink in the distance, which I thought might be an elephant in disguise. This was wrong, however, for the words underneath again explained matters: "Father of a nation, shall I do? Shall I throw myself into your waters, into a grave that never gives back the dead?" The water must have been too deep for her, or else she was afraid of getting wet. In any way, she didn't do it, as that would have spoiled the tale, and I found on looking on that "the continuation of this story will be found in number 239 of the paper." I glanced at the opposite page and saw another picture, in which the irreproachable maiden was again present; this time with a gentleman, a friend, I suppose, for by the words again in the place where I derived my information, I found that "Viola nestled her golden locks on his manly bosom and whispered —." "To be continued next." Such is the choice reading in these papers that say their aim is "to amuse, to instruct and to benefit." The authors of these stories write them in a manner calculated to win the sympathies of their readers in the grossest acts of injustice; attempt to clothe them in a thin garb of moral very presence of which makes the danger tenfold greater. Thousands of copies of these papers are published weekly, and are so broadcast through the land; not only in the cities, but in the smaller towns; even in the farm houses, one may find them in abundance.

The fruits of this and similar reading are seen almost every day in the papers and in the police courts of our large cities.

other day that three young culprits before the New York authorities for some three hundred dollars. They armed themselves with revolvers and had New Orleans, "to paint the town" they expressed it. "Oh, we're bad" one of them to a reporter, who had talk with him. Another of the same who had shot a man, said to the officer him in custody, and with all the airs of a novel braggadocio, that "a feller ought until he downed his man," and he was looked upon as a hero by an g crowd that followed him to the sta-

se weeklies and dime novels are not publishing pernicious reading; the allies of our large cities take special obtain information in regard to the scandal, sifting it to the bottom, and t before the public in all its filth. ill pay thousands to have such matter across the ocean or wired over the it. As gatherers of news they are of success, but so much cannot be said good influence they exert on man-

is to be done, then, to change the of this great mass of readers? Cheap- the standard works will not alone ac- it, for they are already as cheap, if aper, than this popular stuff. Evi- the cure must lie in other paths, and not help thinking that limiting the of the press would be one of the most methods of remedying the evil. r that may be, it is a problem to be he solution of which will confer an ng benefit on the human race.

OF THESES.

a Senior. The Commencement ex- ext June will be incomplete unless I resis finished by that time, and I am gaged, in co-operation with a class- the production of that momentous it, which is to revolutionize the scien- ld and give us a seventy-five dollar a eputation at once. Of course, the g to be done was to choose a subject. itering the Freshman class, we have nstant attention to this all important l have devoted to it many an hour, ould otherwise have been devoted to eeded recreation, pondering over a

large number of subjects in the vain pursuit of something which should suit our peculiar lines of genius. Subjects by the score have been proposed and considered, dozens have been selected, and twelve or fifteen of Luthin's best blank books have been purchased and carefully labelled with the title of our thesis, and as many laid tenderly away on our closet shelves. At the last moment a subject occurred to us which seemed to fill the long felt want more completely than anything we had before selected, and so finally our subject was really chosen. It is as follows:

FAT AND LEAN MEN;

OR,

THE INFLUENCE OF WEIGHT ON INTELLECT.

Before starting to write on this subject it was necessary to gather statistics, and to this end we left, as soon as the term began, on a tour of inspection of the various hospitals, almshouses, theatres and other public places of this country, and spent a couple of weeks in this very arduous labor. The peculiar nature of the subject obliged us to pay particular attention to the beer saloons and wine rooms of the country, with a somewhat demoralizing effect upon our general health; but since coming back to the temperate atmosphere of Hoboken, we have gradually regained our usual condition.

On our return from this extended tour, we invested in a ream of paper and two dozen lead pencils, and began to put our information into shape. We covered the first ninety pages with a history of corpulency, as deduced from ancient and mediæval history, with a table of the weights and other statistics of the principal men since the time of Noah, and mapped out curves showing the relative proportions of weight to stature, girth, size of brain, etc., etc. Coming down to modern times, we gave statistics, collated from various authorities, of the relative numbers of fat and lean men in the various countries of the world, and the way in which these proportions varied with the prominence of these nations in art, literature, science and military prowess, comparing them with the United States as a standard. This covered seven more pages. We also supplied one quarter page with a valuable and extended series of experiments, conducted by ourselves with great care, on prominent citizens of this city and New York, with deductions therefrom, and filled up the remaining two and three fourths pages with general deductions as to the desirability of certain weights, in-

structions for self conversion from one weight to another, rules for dieting in order to maintain a desirable weight when once attained, etc., etc., and were winding up with an eloquent peroration when we were obliged to break off abruptly in the middle of a sentence on attaining the one hundredth page, as we were unable to purchase more thesis paper, our washerwoman at this point having refused to wait longer for a bill of some three years' standing, which ill advised course on her part obliged us to scrape together all our available cash in order to quiet her. This will somewhat delay the publication of our work, as we shall be obliged to secure positions in order to procure enough funds to purchase the requisite paper for its completion before it can go to print.

We desire here to extend our thanks to the Institute for valuable apparatus loaned us and assistance rendered in the preparation of this work, and to express our confidence in the wisdom of thesis writing in the third term, which some rash minds have dared already to assail, urging that the time thus spent could be more advantageously spent in regular recitations and term work. We desire to express our firm dissent with these views and to say that this term has been a most delightful one to us and apparently to our classmates.

ABRUPTIANA.

A BLUNT FACT CUT ON THE BIAS.

BY T. DINGUS KEHOE.

Author of "The Ancient Onion," "Pig Iron Jingles," "The Whiskerdeenie," and other works not worth mentioning.

"Who are you looking at?" exclaimed Alfred Tennyson, as he woke up last month and found the sun shining in his face.

"Don't talk to me that way, Alfred," replied the Sun. "I was only wondering why the British government don't borrow your countenance to paralyze the Arabs with. Is it because they can't get anything to tack it on to?"

"Right you are, Sol," said Alfred. "Whose intellect were you using that time?" "Bismark's," answered the Sun. "I took the whole business, and I'll hock my suspenders if I haven't used it all trying to settle up

that little question about your cousin Bismark'll hire a Dutch carpenter him all over the empire when he finds I've used up his entire intellect."

"Nothing mean about you, Sol, If Bismark ever gets another intellect he'll anchor it on to his head with a But in regard to my countenance, I confess that it's looking rather rummish present, because I'm in a complete organic separation, or in poetic language all broken up. You see the royal the queen, sent down the other day me construct a poem against the being presented before parliament, which compels the queen to darn the prime socks, but I'm blamed if I can start thing. Can't give me any tips on this I suppose?"

"I can't give you any on the poem turned the Sun, "but I'll tell you can do. Just pack up your Saratoga right along with James Russell Lowell he goes back to America. That's where you can get a poem built for free and I'll wager a lead quarter that the think your poetry is improving. I like the scheme."

"That's a good idea, Sol, but America such a blasted wilderness, you know, reclaimed from barbarism."

"Don't you worry your giblets at Alfred. You'll find it plenty large enough to hold you. Why, America has been held as many as thirteen or fourteen men at one time; but I must be going got to go and melt the starch out of the shirt front, so I'll bid you good day, along."

Alfred concluded to follow the plan, so he made a terrible effort, and to get up in half an hour. "I'll hie me to the queen," said he to himself, adjusting his paper collar and pulling gaiters with a boat hook. "I must have her consent, and after that the ducats," and with a yawn that wobbled the furniture and knocked the putty out of the windows he left the room.

* * * *

"Wie gehts, Vic," said Alfred, as he hopped, skip and jump into the royal "How's things?"

"Cheese it, Al," exclaimed the "Keep your hoofs off the floor. polished last week. Where d'you go

love, any way? I haven't seen you with an extensive motion since I fell airs; but I thought you were laid

was," replied Alfred, "but I got ex-r a while, so I could come up and see ctly on biz. You see, I had quite a tion with the sun this morning, and he best way to shake up that poem is for me to go to America along Lowell. He says ideas are lying oose over there, and that's just what of at present. How does the scheme u?"

, it don't strike me hard enough for like it back, Al, but perhaps it might ttle training. I'm lost if you don't . respectable kind of a lyric on that ed old bill. I'd rather be thumped that darning, so if you can make that he cholera by going to 'Meriky, why, skippez vous."

t's the articulation, Vic, that suits eysuckle. If I can't give that bill lache the first day out, then I'll eat eaux. I'll make me off to Jim's im-y, but ere I go, give thou to me the the all important spondulix."

that's so," said Vic, "I was forgetting ow much dost think thou need'st?"

give it up, Vic. I may have to buy a of paper collars while away, and per-have to get out a license to live in k, so I think it will be best to store rs with sufficient rocks."

right," she replied. "Your coffers well supplied. Here is a dollar thirty-merican currency for pocket money; jingo! Al, don't be extravagant just you've got dead loads of wealth with ow, don't delay, Alfred, but tra-la-la grown alacrity, and don't be the rest ntury in getting back."

all be so," said Al, "and I will soon ith a poem that will make your hair

Al, I hope it will be so, for then I longer have to waste the midnight ing up my wool in tea lead."

t will serve a double purpose," said ich will be better still. But my tin declares it's time for me to get a heavy n, so I will take my leave of you. Ta, with the last word said, he turned upon an orange peel and only stopped a step or two in getting down the it getting the cab man to put him to-

gether again, he was soon on his way to Jim's house. Arrived there, he found Jim packing up his effects in an ash barrel purloined from his neighbor's ash closet.

"Ah there, James," said Alfred, "Whither away. What's the matter with the English soil? Isn't it quite rich enough for your blood? I heard your were going back to America. What are you going for, any way?"

"Bekase, Al, the climate don't agree with me. I need change any way," said James, as he heaved a fine large assortment of very elegantly constructed sighs.

"I want change myself, Jim. I've only got a dollar thirty-nine, and I think a little more would make things grow better. But what arrangements have you made for going? If you ain't saying a word, I'll go along with you, and if you are saying a word, why I'll go right along with you just the same. So I've got you cold, anyway. You see, Her Asparagus Ome-letts the Queen gave me permission to indulge in a large, large meander, so I thought I'd just meander over to America, the home of the true brave, or in other words, the land of the licensed Indian."

"I noticed that you had me kinder frigid, Al; so I'm not uttering a syllable. I'm going next Wednesday on the Ticklu of the Pushem-quick Line."

"Next Wednesday, then, is the day that I tuck my saratoga in my vest pocket and put on my old gold derby and my equipoise waist and make weighty tracks for the Ticklu," said Alfred; "but, ere I do, I must hie me to the pow's to put my watch on storage to get the necessary ducats for a good supply of chewing gum. I'll see you, then, on Wednesday next," and with a graceful wave of his left leg he emerged into the street, walked briskly into a man and knocked his ribs out of kilter, but by a skilful twist of his left elbow they were quickly set right again, and he moved on.

Alfred spent the rest of his spare time in fixing up his wardrobe. He endeavored to iron his antique silk hat, and he constructed a fine vest from an old pair of pants. He found one thing wanting in his outfit, that was a pair of light pants for the itchy spring time, so he bethought himself of an idea. When the morn was making a bold, bad endeavor to glimmer, he stole noiselessly around to the house of Baron Cubeb. Arrived, he paused cautiously for a few moments, but silence was the only audible sound. Then grasping his spade, he dug forth the baron's light breeches from the ash heap and with a Herculean

effort he tucked them under his vest. The deed was done, so home he skipped. He cleaned them up with benzine subsequently, and made them do the great dangle act out of the back window to give the fragrant benzine a chance to cool off. After several more dark deeds he succeeded in fixing his wardrobe satisfactorily, and at last the day of sailing arrived. James and Alfred trotted merrily on to the boat, and after the usual preliminaries, the voyage was begun. By the next morning the steamer had gotten fairly out to sea, and she began to breathe a little bit hard, which made him get quite an extensive throb. Of course, this made Al and Jim feel as though their respective inward constructions were anxious to get back to land, but they didn't seem to yearn to discuss the subject, however, so they appeared on deck making a three ton effort to keep on a civilized expression. "Peek-a-boo," said Alfred, as he spied James trying to stand up on deck. "I see you," replied James. Just then the vessel took a good, long breath, and Alfred came rushing on deck like a load of wood. He made a break for James' hand, but he clutched his vest instead, and ripped all the buttons off, which made things rather uncomfortable for James and it made him a little riley as well.

"I don't care, Al Tennyson," he said, "I think you're just as mean as you can be, then, to rip all the buttons off my vest."

"Well, I don't care if I am a mean old thing, Jim Lowell. I think you're just awful to get mad like that."

"Well, I guess I can get mad if I want to. I wouldn't be such a horrid old thing as you, any way."

"I don't care for you any way. My father's twice as rich as yours, and I won't go with you any more, so there!"

"Don't you dare be saucy to me about my folks, Al Tennyson, or I'll slap you right square in the mouth, just as hard as I can. I'm just as reckless as I can be when I'm real mad. Keep away from me now, I ain't afraid of you. I don't care if you have got whiskers. My father's got whiskers as well as you. You better go 'way, now."

"I won't. Jim Lowell, I can fight you, any way. I'll knock your hat right off if you say any more to me."

"Any more."

"There now, I said I'd knock your hat right off," but before he finished these words, Jim grabbed Al's hat and slung it into the briny.

"You dirty, mean old thing," exclaimed Al, "I'll break your nose," and with one powerful blow, he—

(Discontinued on account of sickness in the family.)

OUR PROFESSOR.

He was a queer man, the professor. Tall, broad shouldered, with a slight stoop, he was a good specimen of a New Hampshire farmer. Absorbed in his work, he seldom saw a joke until the rest of us had done laughing, when he would open his capacious mouth and enjoy himself with so much heartiness that we were constrained to give way again to our mirth. His collections were numerous and complete, and there was that in his manner that inspired his students to imitate his example. His chemistry students always saved their compounds, and arranged the neatly labelled bottles with much care. The zoology class started out after skeletons before they had been under his instruction for a week, merely because "the professor had such a nice collection of skeletons, and collections are so interesting, you know."

I remember with how much earnestness I saved up my pocket money until I could purchase the skeleton of a howling monkey, and how proudly I labelled it "Mycetes Seniculus," after the manner of the professor. And then, how we would enjoy the Saturday geological excursions into the country, each of us armed with a hammer and bag, the latter of which always came back well loaded!

Our professor was a great admirer of Agassiz, and had at one time been his pupil, when

"On the isle of Penikeese
Stood the master with his school."

We were not long, therefore, in understanding why we had to be so decorous in his class rooms, since, as we were often told, Agassiz had taught his scholars to look upon the laboratory as God's sanctuary; and was not our professor one of Agassiz's favored pupils?

We were frequently rebuked for slight acts which came rather from the thoughtlessness of youth than from a bad disposition. One of these occasions comes before me now with unusual vividness.

It was at noon time, and we were arranging some minerals in the cabinet, while one of our number strolled from table to table idly fingering each object as he passed before it. At

last he stopped before a skull belonging to "our coachman," as we called our skeleton when hitched together. Unfortunately for our professor's peace of mind, the "coachman" lay scattered over the table in all sorts of curious positions. The thoughtless youth picked up a hand and arm, and by prying open the jaws of the skull (worked by a strong spring), managed to hide the greater part of the hand in the mouth. Calling our attention to this grotesque attitude, we all joined in a laugh. We saw no harm in this then, nor can I to the present day understand why the bones of a cabinet skeleton should be held sacred. However, our professor had peculiar views on the subject.

The clanging gong had just announced that recess was over, when the professor walked in. At first he did not notice anything unusual, and we were not watching him, the occurrence having entirely slipped our memories. At length, after roll call, he glanced up and fixed his gaze on the skull. He changed color rapidly. We became scared, we knew not at what. At last he spoke slowly and evidently with suppressed rage:

"I wish to know who among my students has had the boldness to do this thing? I take it as a personal insult. I thought you gentlemen up to the present time, but now I dare not ask you who did this as you would not tell. If I could find out the shameless author of this deed, I would instantly expel him from this school."

He seemed so much in earnest, so horrified, so grieved, that we dared not look at him. Then, finding that he could not control himself, he seized his hat and rushed from the recitation room.

I usually see the ridiculous side of everything, and laugh when I ought to cry. This used to get me into disgrace sometimes. So on this occasion, as the door closed upon our professor, I burst out laughing. The others looked at me as if I were the most hardened sinner in the room, but I explained:

"Boys, you remember what the professor told us last week about Agassiz; how the fellows took his monkey skeleton and dressed him up, hat and all, and put him on the professor's desk. You remember what Agassiz said; that he hoped from the bottom of his heart that the man who performed the deed was a Christian man, so that he might talk to him thus: 'How would you feel if I were to enter your church and conduct myself in a light and indecorous manner? Would not you

feel insulted? That is the way with me; my laboratory is my sanctuary; there I commune with God. I demand that you act here in my church as you would wish me to act in your church.' Isn't our professor trying to imitate the 'master' a little too much? Oh, it's too ridiculous! What does he do when he comes to a case where there is no precedent?" And then we all laughed.

After this occurrence the professor was scrupulously polite, but rather distant toward us for the remainder of the term, when we passed from under his jurisdiction. But there is one other little incident so directly opposed to the first that it should be related in this connection.

Two weeks after the occurrence related above, we went with our professor on one of the customary geological excursions. In the course of our rambles we came upon a neglected graveyard in a pleasant, shady hollow, and seating ourselves, we proceeded to make way with our luncheon.

I happened during this interval to glance up at the professor, and my attention was drawn to him by the way in which his eyes roved about, now resting on one tombstone and now on another. My first thought was that he was trying to read the inscriptions, but at last his eye rested on a stone with the blank side toward us, and I knew that I had not found the reason. A moment later he got up, and walking over to the monument, gazed at it carefully. Then he returned and folded up his napkin. His every movement now showed that he was thinking of that stone. As soon as we rose he walked up to the tombstone, and with his hammer knocked off a large specimen of unusually fine syenite, which he proceeded to break up into specimens for each of us, reserving the largest for his own collection.

With the incident of the previous week still in my mind, I burst out laughing at the inconsistency of the two acts, but his surprised look stopped me. I never see a neglected graveyard but the thought of this occurrence comes to me, and whenever it does so the same old question arises. Will you answer it for me? Why should an old skeleton, even of a human being, a skeleton used to illustrate class room lectures on physiology, be any more sacred than a tombstone placed over the grave of somebody's friend? If you will answer this question, you will explain away one of the most remarkable eccentricities of our professor.

C.

The Stevens Indicator.

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THE result of the meeting of the Athletic Association, in regard to our base ball interests, was highly satisfactory. The team needs considerable training, and the only way in which it can improve is by those who have any taste for the sport going to the grounds and aiding the men by playing practice games. We have good material and it should be developed. The idea of lacrosse being antagonistic to base ball is a supposition too absurd to discuss. The Directors only needed a little directing; and we hope, by the confining of the team to Hoboken games, to see our usual good standard maintained. Why the challenges which have been received for local games were not accepted, *we cannot answer*. It may have been fear of defeat; but the loss now is even greater, for our team has lost just so much valuable training.

COMMUNICATION.

BASE BALL.

To the Editors of the INDICATOR:

In view of the progress of our base ball team this season, it may be well to look into

the cause of our defeats, and suggest a remedy. Let us read a short history of this year's team. As early as the weather would permit, the captain desired *all* those who ever played ball to come daily to the grounds, so that a team might be selected. This, however, had little or no effect, and the captain was right on appealing for players. Finally he managed, after great effort, to get *nine* men, *four* of these from the High School, who would come down to the grounds and practice. These men (most of them knowing that their places could be taken by others, came down to practice *as a match!* Can any one expect even a first class base ball team under such conditions? Then when we play against the students come down to the grounds to see something great. When the team is playing miserably, and being beaten badly, they (the students) think it is a disgrace and growl and kick, instead of cheering with a vim to practice and try to win. They are held by incompetent players.

It seems wrong that a game that is so thoroughly American, as base ball is, should be played on the ground in an American college. The truth is, we have too many games instead of playing one game well, we play half a dozen.

I think we had better give base ball a try together, if the students are not interested in it. We cannot improve enough to win anything. We should declare all other sports off, except those in town, and save the money on expenses. We could use the money a great deal better to support some interesting game.

B. F. HART,
Acting Capt. of the 1st Team.

SOCIAL.

Friday evening, April 24, President received the students in the Sun rooms of Trinity Church. The reception was under the auspices of the Trinity Guild. It proved a most enjoyable affair. A number of the students sent acceptances and the evening was exceedingly pleasant with the presence of boken friends. Quite a number of members of the church and Trinity Guild were present for the reception. Dancing and singing followed, and the festivities continued until a late hour.

INDICATOR CARD.

st term of the Senior Class is reserved g theses. We have taken the follow- to calculate the work lost on these ons. The average maximum pres- the Senior's brain runs up to ten res, while at the time of exhaust it *inus* two. The stroke is about ten at being the mean size of the letters n the thesis paper). The revolutions o only five per day, so that the centri- e generated is not of any moment. done is evidently so small a quantity ed not be considered at all. As a nce, the members of the class are ating around Hoboken and its vicin- at any definite object, except waiting encement to tack on the *M. E.* to



BASE BALL.

se accustomed to see good games of the attempts of our team thus far a poor indeed.

st game has already been mentioned, econd was nothing but its repetition. becoming demoralized in the third terally gave the game away. Colum- 7 runs then, and afterward but 3—

Our team by scoring one at a time d in adding up 8 ; playing a good up after the third inning.

rsey Blues, of course, we did not ex- efeat, but we hoped to see a better lthey had the game their own way start, and closed with the score 11 e batting on both sides was about ;, but the usual errors of our men e runners home and the score up-

practice" game with the Arlingtons ght surprise. Before our catcher was the men did well, having but few, if rs credited to them. But the usual

time came, and with it the errors, giving the Arlingtons 3 runs. Pattberg pitched well, also Du Commun, while Stevens batted three of the Arlington's pitchers all over the field.

The less said of the Alert-Stevens game the better. The prominent feature was, again, the way in which a team so little used to playing match games can loose all control of themselves at a critical moment.

LACROSSE.

The lacrosse season of 1885 was opened on April 25 by a complimentary match played in Brooklyn, in which the competing teams were chosen from the four clubs composing the Metropolitan Lacrosse Association. N. Y. L. C. and N. Y. Univ. playing Stevens and Williamsburg.

The game was a brilliant one, and the teams evenly matched. Stevens and Williamsburg finally winning by a score of 3 to 2.

A large number of ladies were present, and the grand stand was filled to overflowing with an enthusiastic audience.

The "fancy playing" of some of the older players was very fine. Flannery, as usual, showing up well as an "artful dodger."

It is a significant fact that four of the five goals were made at the end of the field near the stand.

Stevens was represented by Coldewey, Cook, Norris and Post.

The first championship game of the season was played on the grounds of the Williamsburgh Athletic Club, Thursday, April 30, between teams from Stevens and New York University. The ground was heavy from recent rains and playing hard work ; besides the field was small for such a game as lacrosse, considerable time being taken up in scuffling for the ball on the cinder track, and frequently the players would indulge in lively *digging* contests on the embankment beyond the track.

The Stevens team wore their striped jerseys, making a quite effective appearance. The first half of the game was characterized by careful and occasionally too slow play by the Stevens men. The experienced University men worked energetically, and credited themselves with three goals during this half. On the part of Stevens, there were a number of brilliant plays, Post, Norris, Cotiart and Cook eliciting applause. Isaac's long throw for goal, from "first defense," the ball passing

cleanly between the posts, was the play that saved our team from a discouraging defeat.

The intermission was employed in some long running jumps, in which the Stevens' man who didn't adopt the striped jersey, came off the winner. Shortly after, time was called and play was resumed. The playing of the first half seemed to have accomplished worlds for our men. The University men seemed to lack any staying powers, and were unable to get the ball near our goal. This state of affairs would probably have yielded some points for our team, but time was called on account of the sickness of one of the players. The short rest thus gained proved of value to the University men, and with their superior "stick" work they prevented Stevens from scoring, and succeeded, after hard work, in securing one goal for themselves. Post, during this half of the game, played almost a faultless game and filled his position at point very effectively.

The team deserves praise for its playing, as the errors which were noticeable were those which can only be remedied by the experience gained in playing with good teams.

Up in the grand stand sat *three* Stevens representatives, but probably many were with those three in spirit; still we think some bodily manifestation combined with *spirit* would aid materially in giving the lacrosse team the encouragement it needs.

POLO.

Teams from Stevens, Hoboken and Jersey City (Pavonia's and Park's) have formed the Hudson County Polo League, and a series of games have been arranged for the championship of the county. The members of the winning team will each receive a gold medal, presented by the rinks at which the games are to be played. The students should make an effort to attend the games played by our team. Especially in Hoboken does the team need support, the authorities at the rink permitting the Hoboken sympathizers to howl and hiss to a degree that reflects great credit (?) alike on the audience and management. A little gentlemanly tone could be infused into the untutored soul of the Hobokenite who hails from Shipperville by a few courteous and forcible remarks from the floor manager.

We merely have space to note the dates on which our team plays. They are as follows:

May 12—Hoboken vs. Stevens, Hoboken	
" 18—Park's	" Park
" 19—Pavonia	" Pavonia
" 22—	" "
" 27—Park's	" Hoboken
" 29—Hoboken	" "

The Stevens team have played a number of games thus far, and, as a result of practice, they have made a good record, having won three games and played three "the last one being with the "New champions" of the hamlet whose name we bear.

ATHLETIC ASSOCIATION.

At a meeting held Tuesday, May 5, the directors made a report of the unsatisfactory condition of the base ball team. The report was settled by a motion to the effect that the team fulfill present engagements out of the city and then confine its games to Hoboken. The directors to arrange as many as possible in order to improve the whole team. The feeling seemed to be that there had been poor management, and also lack of support for the base ball men in College.



Commencement next month.

The preliminary term of experimental mechanics will be held in June this year.

One examination is hardly passed before another keeps the students busy—perhaps in the cribs.

How the deuce did the mosquitoes that Hoboken's climate already agreed to get rid of?

The most direct method of detecting horse power—Stand behind and tickle the hind legs with a brier.

Find the equation of the path of a ball when thrown by an experienced pitcher! What kind of curve is it?

Delinquent subscribers must pay immediately, or the last two courses of the collation of the I. P. Co. will have to be dispensed with.

Though you be only a Freshmen, you can still procure for yourself and *cetera* a ticket for the Senior promenade, provided you wish to invest.

Difference between Theory and Practice : The results of theory (*e.g.*, Rankine's) are too true to be real, while those of practice are too real to be true.

At the next meeting of the Alumni Association, the question, "What changes should be made in the Curriculum of the Institute?" will be discussed.

Can any one tell us what has become of our "yaller dog"? Has he perhaps been sent to the exhibition of canine curiosities to compete with spinster curs?

Sweet Sixteen.—Prof. : "What does Rankine say about the power of man?"

Mr. B. : "Professor, all I remember is number sixteen in the table."

The zephyrs are blowing, and summer is nigh;
The sun's rays come down perpendicularly.
The Freshies are ready to migrate in May:
They go out to row "crowned" with carmine and gray.

Our base ball players are complaining that "not enough time is left them for practice." It is abominable that our studies should interfere with athletics to such a degree.

The gymnasium reminds one of the pedestal for the Bartholdi statue. Everybody wants it, but there are no funds. As to which one will be erected first, no "tip" can be given.

About three weeks ago a Freshman perpetrated the following *joke*: 1st F.: "Have you seen Coffey around here?" 2d F.: "No; but I have seen 'Pink Tea' about this place for the last two weeks."

C. P. is a term which has become quite obsolete in the chemical laboratory. The small boy will suffer from the same disorder if he continues pumping hydrant water into the "distilled H₂ O" bottle.

Photographs of several of our handsome Seniors are being sold on Broadway side by side with pictures of Mary Anderson and H. W. Beecher, five and ten cents a copy, according to size of—moustache.

Exercices de Conversation Francaise :

Mme. A. : Voulez vous nous montrer vos gants de suede?"

Free translation by a Fresh. : "We want to look at your undressed kids."

Seeing a Sophomore drinking water at the rate of twelve miles an hour, the other day, we asked him why he didn't take more time. "Why, you see, by drinking so fast, I manage to swallow water with the air. In a few moments I have all the pleasing sensations of soda water, without the flavor."

How quiet the Institute has become since the Seniors have stopped recitations! Tomes of long forgotten lore are now hauled daily from the library shelves, where they had been moulding undisturbed (even by a duster) ever since the last Senior class had used them while "working on their theses."

Professor: "You were smoking, were you not?"

Student: "No, sir."

P. : "But there was certainly some smoke there."

S. : "Yes, sir."

P. : "Well, where there is so much smoke there must be some FIRE, so I'll fire you."

And he fired.

It is worth while watching a Junior cleaning a beaker and saving every billigram of precipitate, when he well knows that the balance he uses would be confiscated by the government, if employed for weighing out sugar or butter. Still the "books" of many a Junior show grams to four decimal places, without there having been any demonstrable "fixing of accounts."

A Montreal paper says: "During the coming month a meeting will be held in this city for the purpose of considering the advisability of establishing a confederation of all English speaking nations." It won't do, gentlemen; it might be very handy in some cases, but if Canada ever hitches on to us, what on earth will become of our bank presidents and cashiers, hey?

Professor Wood is very fond of transposing himself and class to the so called Mechanical Laboratory. He says the M. L. exists in the imagination; and also, that it exists at the centre of the earth. Consequently, the imagination is the "centre of the earth." So that, when you read in *Shaw* about the imagination displayed in "Paradise Lost," you will, of course, know that he means the "centre of the earth," where he evidently must place the scene of Satan's sufferings!

Advertisement: Beautiful, handsomely furnished rooms with all modern and ancient improvements, to be almost given away to respectable, first class young gentlemen only (Stevens men not excluded), at the fabulously low price of \$— hebdomadary. Inquire at Mrs —, No. —, — Street, Hoboken.

The blanks in the above notice will be filled out on application for any of our bulletin board—ers. As regards the charge, confer with the business manager of THE INDICATOR. No extra charge for including ladies in the advertisement.

Workhouse boy, who had been apprenticed to a small farmer, brought up as he had run away.

Guardian: "Did they beat you?"

Boy: "No, sir."

Guardian: "Then why did you run away?"

Boy: "Please, sir, soon after I got there, a pig died; they salted it, and we had fur to eat it. Then a calf died, and they salted it, and we had fur to eat that. Then master's grandmother died, and I seed 'em taking some salt up stairs, so I runned away."—*London Topical Times*.

At Williamsburg A. Grounds.—Miss S—: "Mr. C—, who is that Stevens man, way down in the middle of the field?" "Which one?" "Why the one with short trousers."

Mr. C—: "But they all wear knickerbockers."

Miss S—: "The one with the sandals."

Mr. C—: "I fail to recognize him."

Miss S—: "You surely see the one with Roman style stockings."

Mr. C—: "I don't understand your description."

Miss S—: (desperately) "Well then, the one with the bare l—limbs."

A Sophomore writes the following: "Dear INDICK.: I am afflicted with the tender passion. The night before last I 'saw' her to the front door, and there sighed in unison with her, our

fond hearts throbbing beneath our touching waists. Suddenly the gate opens, and Beelzebub, in the role of 'old man,' issues therefrom, and, with an instrument which he lifts from the ground without bending, 'impresses' me from behind, letting the force act only an instant. She drops *up* stairs, while I fly *down* the stoop in great precipitation, *i. e.*, precipitating my watch, a five cent piece and half a collar button. Now, desiring to find out all the 'circumstances of aforesaid motion,' and knowing that our Juniors are just now investigating the moment of *momentum*, I beg you, kind INDICK., to ask any one of that illustrious class to calculate, first, *V*, my velocity of translation; secondly, *W*, my angular velocity; thirdly, *E*, the energy I stored during the fall; fourthly, *h*, the distance of the spontaneous axis from the centre of percussion, *A*; fifthly, whether I would have descended in less time had my mass been concentrated at the centre of gravity, *g*; sixthly, what would be the place of concentration of mass in order to make *E* a minimum and *t* (the time of descent) a maximum (that I may know how to act in the future)?"

The data given are the following:

"W.—Weight of my body, 78.3 lbs.

"M.—Mass of the old gentleman's 'Waukenphast' (unknown, but can be averaged by the method of least squares).

"V.—Velocity of lightning—velocity with which the impulse was given.

"*f*.—Coefficient of friction of the stoop; and

"R.—Resistance thereof to be calculated from square foot of sticking plaster, and an ellipsoidal 'bump,' the dimensions of the axis being 2, 1, and $\frac{1}{2}$ inches.

"K.—Principal radius of gyration, same as that of a spindle.

"I promise to subscribe for another copy of the INDICK. (for *her*) if you succeed in enlightening me on this subject. Yours forever,

"S. O. F."

The Soph. forgot to mention the number of steps and the size of each, as well as the resilience, and the modulus of elasticity of his skull, besides other minor particulars, such as the attraction of *she* as compared with that of the sidewalk and the shoe, etc., which acted rather as perturbations than as direct influences. Still, if anybody wishes to calculate the problem gratis (we do not wish to insult by offering our profit as premium), all data can, no doubt, be procured from "S. O. F." through our medium.



We hardly know where to look for what is of interest to us in *Van Nostrand's Magazine* for March. "A new Method of Shafting through Water Bearing Loose Metals," with its accompanying illustrations, is the first few pages. The article describes the apparatus and the method used, also the progress made while in use. We dare not attempt to say anything about the "Analytical solution" of a certain problem on a particular kind of truss; we had that last term. "Engineering Inventions since 1882" is well worth reading. It treats of improvements connected with civil engineering, bridge work, and many others.

The *American Engineer* of Feb. 27, contains drawings and description of the engines of the S.S. "Australasian." "The Manufacture of Whitworth Steel" is short but interesting and instructive. Next week's number contains a report on the "Strength and Safety of N. Y. Elevated Railroads." The tests were carried on by Prof. Thurston, and the conclusion in regard to ultimate destruction of bridge members, states:

So far as I am aware, and so far as I can ascertain by the careful study of the results of experiment, both as made by others, in the investigation of this question, and as made by myself in the endeavor to determine the effect of long continued and intermittent loading, there is no evidence extant, and nothing to give the slightest foundation to the belief that good wrought iron, loaded within the elastic limit, will ever yield either to stationary or intermittent unreversed loads, or that crystallization can ever take place under such conditions." All the short articles are interesting.

A new Brazilian war vessel, "Riachuelo," has been announced the most perfectly constructed of war afloat, possessing in regard to speed and arrangement and fire of her special advantages not contained in any other ship. She is a twin screw turret vessel of ten thousand tons and six thousand horsepower; built of steel; her length is three hundred and five feet, width fifty feet and depth

thirty feet. The armor plates are ten and eleven inches thick, and the armament consists of five 9 inch breech loading twenty ton rifled guns in two revolving turrets, and six 6 inch breech loaders, besides fifteen Nordenfelt machine guns. In addition, the vessel is provided with a number of Whitehead torpedoes. She is calculated to make fifteen knots an hour, running at that speed for over four thousand miles without recoaling.

E. P. ROBERTS, member of the Institute of Electrical Engineers, has contributed to the *Electrical World* of February 28, an article on Storage Batteries in Commercial Use.

The National Association of Stationary Engineers of the United States, is aptly termed "The New Force" in another article. It ably discusses the value of the Association to the world at large. "The Steam Engine Indicator and its Use," a continued article, would be of much value to many of us if carefully studied.

Mechanics for March gives a treatise on the Tehuantepec Ship Railway, which is fully illustrated. "New Forms of Friction Brakes," also illustrated, treats of four or five of the newest forms. Various other articles are interesting.

We advise some of the many amateur telegraph operators of Stevens to consult the *Electrician and Electrical Engineer*. "The Construction of Lines for Electric Circuits" would give them some points. It contains the report on "The Edison System of Underground Conductors." Drawings fully illustrate the methods. Electric lighting is treated of in various ways.

From the "Longfellow Memorial" number of the *Bowdoin Orient*, we learn a great deal of new and interesting matter about Longfellow. It is all well told and instructive.

We have just received from the Scovill Manufacturing Co. the seventeenth number of their photo series, entitled "First Lessons in Amateur Photography." Mr. Spaulding, in writing this work, has used as a basis lectures delivered by him to his class in the High School, of which he is principal. While containing much that will be passed over by the amateur photographer, this little book contains many details which are seldom found in such a work, such as lantern slides, transparencies, etc. The chap-

ter on preparing silver paper will be found to be very instructive and interesting.

The *Weekly Courier* has one of the largest circulations of all our exchanges. The *Courier* Company publishes from 800 to 1,000 copies per issue. It consists mainly of news and must be interesting to any one who are connected with the university.

The following and many more are on hand: *Amherst Student*, *Collegian*, *Burr*, *Lafayette*, *Michigan Argonaut*, *Tech*, *University Magazine*, *Yale Record*.

THE ECCENTRIC.

We have received the *Eccentric* for the present year, and are pleased to note its neat appearance and very creditable reading matter. It is in some respects an improvement on the production of former years. The illustrations are more numerous and of greater variety and excellence, and the same may be said of the literary portions. Although the humorous element predominates—and much of it is very good—there is a number of articles of the opposite order. Among these we notice especially the little poem entitled, "The Three Roses." Its ideas, figures and language are beautiful and finished. The article, "A Few Words From the Alumni," is a very sensible and encouraging one, although it fully points out the respects in which a student must necessarily be defective when starting out, however careful his college preparation, and the work which must be done by him before securing a permanent foothold in the profession. The lighter contributions are, as before remarked, of very fair quality and the general character of the magazine is very creditable. There is, however, one portion open to criticism. We allude to those articles whose humor is at the expense of our professors, and which is in some cases rather too severe. Students are generally apt to be thoughtless in this regard, and fail to see the wounds which their witticisms may inflict. Although these remarks are made at this place, we wish them to be perfectly general, applying to ourselves, if deserving of it, as well as to others; and we make them rather in a suggestive than a censorious spirit, for we think that the error committed is one of thoughtlessness rather than of lack of feeling, and whose prevention needs but a suggestion.



"Can't we make your lover jealous, miss?"
"Oh, yes, sir, I think we can, if we *put our heads together*."

"That's very singular, sir," said a young lady when we kissed her. "Ah, well, we'll soon make it plural."

An exchange tells us that its soul is harrowed. The labor is thrown away. The soil is not worth cultivating.

"Is it possible, Miss, that you don't know the names of some of your best friends?"
"Certainly. I don't even know what my own may be a year from now."—*Ex*.

"Landlord, you do me too much honor; you let me sleep among the Big Bugs last night."
"Oh, don't be too modest, my dear lodger, I doubt not they have your own blood in their veins."

Persons who visit our sanctum will greatly oblige us by leaving everything just as they find it.—*Michigan Journal*. Wouldn't you like that they should give you a little valuable information, and so leave you wiser than they find you?—*Ex*.

A young lady on Monroe Street refused to allow her sister to borrow the former's beau, as an escort to a party, saying, "It is not good that man should be a loan." She had not been a member of the Bible class for nothing.—*Chicago Tribune*.

The Professor of Systematic Divinity at — Seminary, being indisposed, was not able to be with his classes. A notice to that effect was given to the men after morning "chapel." Whether the professor, who gave the notice, belonged to the "newer school," or merely to the orthodox school of the Sydney Smith type, is not known. His words were these: "The professor, being ill, requests me to say that the seniors can keep on through *Purgatory*, and the middle class continue the *Descent into Hell*, until further notice from the professors."—*Ex*

* THE *

Stevens Indicator

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HOBOKEN, N. J.:

* Stevens Institute of Technology. *

RUSSELL BROS.' PRINT.

THE STEVENS INDICATOR.

THE
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SCHOOL OF MECHANICAL ENGINEERING,
FOUNDED BY THE LATE EDWIN A. STEVENS,
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HOBOKEN, N. J.

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T H E

Stevens Indicator.

Vol. 2.

HOBOKEN, N. J., JUNE, 1885.

No. 6.

A SONNET.

[AFTER DANTE ROSSETTI.]

If I were loved as I would be,
And as I love I would be loved—
And by that measure be it proved—
If I were thus beloved by thee,
Then nothing could remain for me
Beside, to hope for or desire;
To no more doth my heart aspire:
For, with full passion, ardently,
And with an all consuming fire,
I do love thee most utterly;
And, for my perfect happiness,
I pray thee tell me truthfully,
Is it thus thou lovest me?
Oh, my beloved, answer "Yes!"

WILL H. WALL.

STEVENS AND HER FACULTY.

The tenth anniversary of the graduation of the first class taking a full course at "Stevens," the "Graduation Day" of the class of '85, is a fitting occasion for a glance back upon the past story of the Institute, for congratulation and cordially greeting of its Alumni, and for a word to the present condition and the future of the college.

Fourteen years ago, the princely liberality, and the intelligent public spirit of the late Edwin A. Stevens, supplemented by the action of a Board of Trustees and the then newly appointed President, who saw the great need of the United States, of such an institution, and who had the wisdom and independence requisite to the carrying out of such a plan, secured for the State of New Jersey, and incidentally for other States, as well, this much needed School of Mechanical Engineering. Its organization, despite the financial strength provided by the testator, was effected in the face of many and serious difficulties. Such an institution as was proposed had never before been organized, and, in many respects, the officers intrusted with its creation were entirely at a loss for precedents. As must necessarily be the case in all such pioneer work, it was only possible to prepare a provisional plan, leaving its final development to be determined

by time and experience, guided by the opinion and advice of members of the profession whose standing, experience and judgment, and whose interest in so great a public benefaction, should enable them to assist effectively in giving it a shape that would insure the highest efficiency. Under such auspices it has had a growth which, although never as rapid or as satisfactory as its friends might desire, has been continuous and uninterrupted.

As such a course of instruction had never been before attempted in precisely this form, and of such extent, the work began, as just remarked, under peculiar disadvantages. No text books had ever been written embodying the theory of American practice in this department of engineering; just what should be considered essential to such a course was a matter still to be settled; what should be adopted as the initial and what the final steps in a course of indefinite limits, and of life-long extent; these, and many other questions, came up for consideration, and could only be settled definitely, after some experience had been had in actual work. It was evident enough that a beginning must be made with the "A B C" of this hopelessly long alphabet; but it was not so easy to decide just how many letters could be safely attempted in a four years' task. Old engineers, however, holding the highest places in the profession, examined the scheme as finally laid out, approved it, and expressed unbounded satisfaction at seeing a probability that, at last, the young men of the country were to be offered opportunities that they had so greatly needed, in their younger days, but which were then absolutely unattainable.

Not the least of the difficulties then, as since, impeding the prosecution of the work in the form originally intended, was the insufficiency of the funds at command for a work having far greater scope, and demanding greater expenditure than was at first contemplated. The erection of the building and the purchase of indispensable apparatus at unavoidably great expense, and especially the demand of the U. S. Government for a "Succession Tax" under the provisions of war legislation then still in force, crippled the young school very

seriously. In some departments, it was found impossible to obtain much needed illustrative apparatus, and almost nothing could be done toward the organization of the workshop, notwithstanding the fact that it was considered an essential feature of such a school.

So formidable were these difficulties that it was at one time seriously proposed to defer the opening of the school, until, by accumulation of income, the permanent fund could be increased to at least the amount originally in the mind of the testator. It was finally concluded, however, to go on, and the school was opened.

eral departments, has given us the long needed workshop, and has established a hardly less useful department of electrical engineering. Every member of the faculty has similarly applied more or less of his income to supply the necessities of the school, and each one has done what he could to bring up his department to as high a state of efficiency as possible, purchasing apparatus and employing assistants, when needed, as best he could, whenever the funds of the treasury were insufficient for the purpose.

The work of the Institute has thus been carried on in, on the whole, a very satisfactory



Four years later, the first regular class was graduated, a few students having, in the meantime, come in from other institutions at advanced points in the course, and taken diplomas in the two preceding years. Ten years have passed since that first class left the Institute, and we are now able to look back upon a period of most gratifying progress. Financially, less has been accomplished toward giving the college a safe and sound basis than had been hoped; but the liberality of the president, who has turned into the Institute a large proportion of his receipts from its treasury, in the form of innumerable donations to its sev-

manner; and the course has been gradually and steadily brought more thoroughly into accord with the original plan, at first so incompletely carried out. Several of the Alumni are now approaching an age, and a status, financially, that enables them to look forward confidently to a time when they, too, will be able to be of substantial assistance, and more than one is contemplating the propriety of giving such aid by founding scholarships or otherwise. The Association of the Alumni has already made an encouraging beginning in this direction, and is hoping to do much more in the future. The college needs, and

oftably apply, much larger sums than likely to come in these several ways, not only be expected to attain, to the at high position and that maximumness which its founders have aimed at, some wealthy and liberal person can be so worthily succeed the first and great benefactors, and to build a proper structure upon the foundation which has been so deeply and substantially laid. The stone now added will make a visible addition to a structure, the lower courses of which are unobtrusive in proportion as they are solid and stable. Until such a friend can be found, the limit, in the direction of the increase in the number of young men who can be at the same time benefited by this institution, must be considered as having been already practically reached.

The course of instruction has been, during this period of growth and development, constantly changing, to meet the continually changing demands of the time and to bring into accord with the views of the faculty of the profession, a steadily improvement of preparation permitting the elevation of the standard for admission and extension of the curriculum. This course of progress, it may be confidently expected, is one in which continual advance is expected. The professional schools, of engineering, as well as in law and in medicine, are properly post graduate institutions, and every man who can afford the means will seek to obtain a general liberal education, before entering the professional course. This is becoming, each year, more common, and the result may be expected, to be that all purely preparatory studies will be pursued in the extra professional school and the school of engineering may devote all available time to the purely professional work. The rapidly progressing plan which is leading to a distinction between the "manual training school" and the "school of engineering," in all civilized countries, must unquestionably lead to future changes, the nature and extent of which cannot yet be fully anticipated. Probably may lead, in the majority of such cases, to a division at some point in the course of the one set of students going mainly to the shops, the other remaining a longer time in the lecture rooms and laboratories. The choice of men may probably pursue a shorter; and, a longer course. The matter is one which will demand thoughtful consideration.

It is in the direction of the development of the useful influence of the Institute beyond its own walls that its officers and faculty, as well as the Alumni themselves, to whom such influence is mainly due, have most reason to feel peculiar interest and pride. In the short life of the college, and despite the small number of its representatives, its influence is felt in every branch of professional work. Several of our graduates have been intrusted with the organization and direction of similar schools, or departments, of engineering in other colleges, and a number of others are likely soon to accept similar positions, and it cannot be doubted that the future of the profession in this country is to be determined, to a very important degree, by the character of the men who have been sent out by "Stevens." A number of the Alumni of the Institute are connected with the technical press, and are therefore likely to make their influence, and that of their college, felt, in the advancement of every branch of their chosen profession. More than one is at the head of a great industrial organization, putting in practice the principles taught, and applying the knowledge obtained, at "Stevens." Others are revolutionizing the methods of operation of the motive power, and other departments of important railroads, by systematically conducting investigations of the properties of the materials supplied to them and used in all branches of railroad work. Two have the honor of occupying the highest positions that can be given the mechanical engineer, as such, in the whole range of railroad work—positions of enormous responsibility and importance. One Stevens man is developing in the northern sugar districts of South America; another is organizing electric lighting establishments in Europe, and several are perfecting themselves in special lines of work, at foreign universities, and are soon to return prepared to praise their Alma Mater, by their deeds, in many other lines of useful labor. Graduates of "Stevens" have already won high honor by conducting investigations of great interest and value to the profession, and it would be difficult to name a direction of recent advance in applied science in which some "Institute man" had not taken part.

In all this, we have a common interest, and feel a common pride. But we feel a double interest, and take a double pride, in it as an evidence of a simple beginning of the great harvest that we hope to see reaped by the Institute in later years, when age, experience,

and opportunity shall have vastly extended every avenue for good. So much having been accomplished in ten short years of beginnings, what may not be hoped for, when maturity in age, established influence, and the aid of several times this already long list of noble representatives, shall have brought in the reward of many years of earnest work? But increasing power and influence bring increasing responsibilities, and those upon whom those responsibilities fall may well feel some anxiety lest they fail to perform their part of the work aright. It is here that the Alumni and the officers of the Institute have common duties. The one has the labor and the apparent responsibility; but the others none the less are bound, by every tie that binds them to Alma Mater, to lend a helping hand, assisting by their countenance, and by their advice, in every way in which their experience and judgment may give them the power, in the work thrown upon the faculty, in the development of better methods, and the construction of a more valuable course.

The exceptionally pleasant relations which have always existed between the faculty and the Alumni make this an easier task for the latter, and enables the former to ask such assistance without hesitation. It is to this kindly aid, this frank and free conferring of graduate with professor, that we already owe much of our success; and it is evident that the immediate future is likely to see such assistance given with no less free and kindly disposition. The members of the faculty watch the outgoing friends and pupils, as each class breaks up and departs, with an interest which may not be easily realized by those who are about to leave us, but which is real and earnest, and which grows rather than diminishes with time. That this interest can be always, or perhaps ever, fully reciprocated, is probably not to be expected; but we have daily evidence that the more earnest and thoughtful, and the majority, indeed, of our pupils do remember, with the kindest of feelings, the institution to which they owe their special advantages, and the instructors who have always honestly and heartily, if not invariably with as great success as either they or their pupils could have desired, labored to make the most of those advantages. It is a great encouragement to all friends of the school to see the graduates of Stevens coming back, in larger and larger numbers, at each annual recurrence of "Commencement," to greet their old instructors, to see the growth

of the Institute, to aid the faculty council, and to cheer them by their : of such good work as has been done the year. The Alumni have already much to assist the officers of the I and it is hoped by every friend of "S that they will hereafter do much more mote her best interests, by freely to advice and commendation, where c and in time, when possible, by still m stantial aid. Meantime, we are makin progress.

R. H. THUR

THE MECHANICAL ENGINEER

A frolicsome life, without care, without s
The American students lead :
Though the purse be slim, and the gover
Still never they stand in need.
With every one's trust they go on a "bu
I fancy the matter clear—
That too is the "go" with the fine emb
Mechanical Engineer.

The hammer he swings till the anvil ring
And swings his girl in the dance ;
The iron he rolls and casts it in moulds,
And oft casts an amorous glance.
With wonderful zeal he tests any steel,
And tests the love of his dear—
Yes ; such is the "go" with the fine emb
Mechanical Engineer.

He breaks every rule, and breaks every t
And oft his promise breaks ;
He breaks many hearts, when'er he dep
And his tender friends forsakes.
He turns every brass, and the mind of ea
I fancy the matter clear—
Yes ; such is the "go" with the fine emb
Mechanical Engineer.

SHAW.

The Sophomores have just finish course in literature, and have laid thei upon the shelves, perhaps, forever ; bu ing so they must have pondered a littl advantages and disadvantages of the s

The former are certainly numerou one will question the necessity of the to a good education, nor the great b be derived from a study of the intelligi cism on the various kinds of writings a authors.

The mode of treating them, howeve gard to the attention bestowed upo and the lack of it on others, is open t tions, as is also the study of the su presented in our text book.

ing the book one cannot help notice the generosity of the author toward English writers compared with their American contemporaries.

It brings back very forcibly to the reader, the old English saying: "The only Americans; they have no literature," as if to give credence to these words the author proceeds to devote two and a half pages to the unintelligible poetry of the mad visionary Shelley, while to Edgar Poe, a poet of a somewhat similar nature, he gives half a page.

Poe was morally, Shelley was at an immense distance below him. Poe was an egotist; Shelley, to the whole world; he aimed his most powerful attacks at religion, marriage and the government; he spent his whole life in throwing his attacks at the objects of his hatred. "The Witch," "Helen," "The Witch and the Hellas" so far above "The Bells" and "Annabell Lee"? Any number of minor poets to be given half a page, while Joseph Drake, author of "The Culprit Fay," "The American Flag," is dismissed in five lines. It may be that these poets have contributed to the growth of literature more than Drake, because they lived at a time when good poets were particularly scarce; but that does not detract from the merits of the poetry, and those who have read it, say "The Culprit Fay," will certainly give it the merit. But we will leave the poets to peep at the department of history. The author spreads himself for the length of a page and a half, on a "History of Civilization," by Henry T. Buckle, and yet the work that "its arguments are inequitable; its statements inaccurate." He gives his generosity toward the Americans; he takes our three greatest historians, Bancroft, and Motley, and divides a page equally between them. I can notice but one case, though I think many more could be found—this one, from the similarity of names to two of our own great men, attracts attention. John Webster was one of our original Shakespearian dramatists in good order, and the author does right in giving him half a page, but is his patient, for the sake of Noah, of this country, of so much importance to literature that he can only mention his name?

Nothing is done with Audubon, Richard Grant White, and many

others. Indeed, if we are to judge the author by his book, we would say that he is "quite English."

There has not been too much attention paid to the English writers, but there has been too much slighting the American. It is natural for us to want to know something of our own literature, and if we have but little, then by all means let us know that little well. A citizen of this country ignorant of its writers is like a traveller from the New England States going abroad in search of scenery, before having visited Niagara or viewed the wonderful beauties of the Yosemite.

We have said so much about the unjust treatment of our writers, in not giving them more space, that we may seem inconsistent when we now say that there are already too many names discussed in the book; yet such in our opinion is the case.

The attempts made to learn about so many authors is very dissipating to the minds of students. When they come for examination, they have a confused idea that this man wrote novels and that man histories. They get John Jones' life mixed up with a half of Tom Brown's and some of Henry Smith's; or, if they get through all right, they go about congratulating themselves because it is not necessary to remember it any longer, and they immediately proceed to forget all about it. Now, would it not be better to take one or two men as representatives of a particular time or style, discuss their characters and their writings more fully than at present, and if possible read selections from their best works? This would create a taste for more extended reading, and if the student had any love whatever for literature, the other writers would be taken up in due time and be read with pleasure in proportion to their worth.

OH, FANCY!

Oh, fancy a petition granted!

Oh, fancy a Freshman with a silk hat!

Oh, fancy a fly wheel with wings!

Oh, fancy a diminution in the number of books "needed" at Stevens, with a coetaneous depreciation of prices in the paper market!

Oh, fancy cutting yourself with the knife edge of the balances used in the weighing room!

Oh, fancy our alumni offering to furnish a gymnasium for our poor, enervated, over-worked students!

Oh, fancy our poor, enervated, overworked students!

Oh, fancy a graduating thesis which was not intended to revolutionize the whole mechanical world!

Oh, fancy a crank with brains!

Oh, fancy one sewing on a button with the thread of a screw!

Oh, fancy a law compelling the employment of unadulterated, genuine *aqua distillata* in chemical laboratories!

Oh, fancy a Sophomore cordially shaking hands with Mr. Shaw!

Oh, fancy the loyalty of an engine making 300 revolutions per minute!

Oh, fancy a student's lamp relating how many lessons it has illumed!

Oh, fancy a dentist for the teeth of a gear wheel!

Oh, fancy a lid to the stuffing box!

Oh, fancy a fellow "making up" his conditions promptly!

Oh, fancy somebody going up into the "look out" on the roof of the Institute!

Oh, fancy an alumnus wearing a college pin!

Oh, fancy the gun that was fired at the undershot water wheel!

Oh, fancy a "Raystowron'g" for the men employed in the laboratory *in centro terrae*!

Oh, fancy the editor of a wrought iron journal with bearings of brass!

Oh, fancy a grand Hoboken bachelor's hotel, *alias* student's boarding house, in connection with the College, the supervision thereof being in the hands of the boys themselves!

Oh, fancy the stop cocks that crow with the break of day!

Oh, fancy a prep. trespassing while a Freshman is in sight!

Oh, fancy the Institute clock keeping correct time!

Oh, fancy the electric gongs striking at the end of every hour!

Oh, fancy any one whose T-square has not been sto-wed away somewhere!

Oh, fancy a consumptive steam-chest!

Oh, fancy coeducation at Stevens!

Oh, fancy the hair on top of a cross-head!

Oh, fancy the sun rising when a Junior gets up, and fancy the sun setting when a Sophomore goes to bed!

Oh, fancy the "copper" to arrest the gang (ue) of an ore!

Oh, fancy a Stevens man taking the trouble to sharpen the workshop tools before using them!

Oh, fancy the razor with which the steam is cut off!

Oh, fancy the button holes in the jacket!

Oh, fancy a graduate being asked a in political economy!

Oh, fancy a Senior who has not at positive *engagement*!

Oh, fancy the doctor that killed points!

Oh, fancy a fall of prices in the producing any effect on the amor student's workshop or laboratory exp

Oh, fancy the kernel of a screw nu

Oh, fancy Freshmen walking quietly the halls without "music," while class is attending to a recitation or a

Oh, fancy that there is no "first," "third" or "fourth" class at Stevens of "Senior," "Junior," etc.!

Oh, fancy the seed out of which plant grows!

Oh, fancy the boss politician of the faction of steam!

Oh, fancy a Stevens library, the which may be taken home by the stu

Oh, fancy an enterprising man o setting up a lunch counter on the car

Oh, fancy the light shed by a wood

Oh, fancy a catalogue for our libra

THE FAITHLESS LOVER'S EX

(From the German of Em. Pohl.)

Am I to blame, for having won her he
When singing to the lute's sweet to
Am I to blame, if she felt Cupid's dar
Because my eyes too kindly shone?
Am I to blame, because my features?
Expressed that but for her I sighed
And falsely spoke what never I did sa
Am I to blame?

And when in sweet, calm moonlit hou
Her head against my bosom leaned
Am I to blame, if a resistless power
Urged me, until a kiss I gleaned?
Her silence, while encircled by my ar
How could I guess its riddle then?
The nightingale had sung with sweet
Am I to blame?

Am I to blame, because those hours' g
You guileless child! burns in your
still?
Am I to blame, if I forgot that long a
Like fairy stories told a child wher
And if another now my fancy fills
And charms me into ardent love
While kissing her midst nightingales'
Am I to blame?

HIER REPLY.

Am I to blame, because my trembling heart
Knows but of love and faith as one,
And does not dream of faithless doubt,
Where true loves dwell in unison?
Am I to blame, if he, who is my only choice,
Retains my love for all eternity?
And if I die when lost to me his voice,
Am I to blame?

THE RUMSEY UNRAVELLED.

The James Rumsey was built in the year K, and is a slight modification of the ark. During the war of 1812 it was used as a cattle boat, but before the close of the war the cattle raised a big howl because the boat was too rickety, and they said that if the old scow wasn't taken off the route they'd kick somebody all full of big holes and little dents, and as none of the company were desirous of transmitting daylight, the boat was taken off the cattle route and used as a conveyance for the human tribe.

It now plies between Barclay Street, New York, and Hoboken; and be it known to all, that certain of the students of Stevens ride in it daily at the imminent peril of their lives; but it can't be helped, you know. It's all in the great cause of science. We're so used to it now though, that we'd feel rather lonesome without the excitement. We have names for the different trips, such as "the Monday morning hair breadth," "the Tuesday evening hair raiser," "the Friday night gore stiffener," etc. And if you ever want a daisy hairbreadth escape with a whole brown stone front to it, just come down to the Barclay Street Ferry, pay three cents, and take the James Rumsey. Well, if you don't have just sixty-seven dollars' worth of fun for that three cents, then, we'll "set 'em up" all around.

Just let's give you a specimen. Take last Thursday morning. We made a "hair raiser" trip that time. The "gore stiffeners" are beyond description. You'll have to try one yourself. Well! Here's the "hair raiser." The first thing to do was to run down Barclay Street like a ton of coal for about two blocks, and knock all the dinner cans out of the hands of the Hobokenites who were emerging from the boat, and if a man was met who had no dinner can, why then the wind was knocked out of him instead. It all answers the same purpose, you know. It makes things just as interesting whichever way it is. Then we arrived at the ticket box and found one or two bow legged Jersey men trying to

scrape up intellect enough to find out whether they ought to buy a ferry ticket or bum around the ferry house the rest of the day, but taking particular pains to block up the whole place in the meantime.

Then after a desperate effort, we got through and managed to slide through the gate as it was being closed. They make it a principle on this line to close the gate as soon as possible, and then loaf around the slip while the captain plays pedro for the beer or composes choruses on the steam whistle. They don't consider it the proper caper to allow any one to get on board unless he lays around the gate about half a day for a show. Well, we got aboard, and had to wait the regulation time for the captain to get ready to go out. After a while the chains began to make noise enough for a young cyclone, and directly we began to sneak out of the slip. We hadn't been sneaking very long before the captain began to kick up a horrible rumpus in the pilot house. Pretty soon he bawled down to the engineer, to find out whether the old tub had been started or not. He said he'd forgotten whether he'd started her up or not, and the engineer said "he didn't know narithin' about it," so they had to send a deck hand to the side of the boat with a big pole to stick in the mud, to see if the boat was moving. It was found that it was, so the captain said "he guessed he'd better go up and steer a little, just to keep the wheel in working order in case it should be needed." We crawled along for about twenty minutes then without any disturbance, when all of a sudden the captain got up a regular riot in the pilot house again, and then he and the engineer had a nice little duet. "Great Heavings!" shouted the captain, "we're lost. We're all gone entirely. Here comes a lager beer cask bearing right down on us. Quick there, reverse the engines! Cut away the walking beam! Man the life preservers. Hey there! By heavings!"

"What yu doin' up thar, any way?" drowsily replied the engineer, as he emerged from the gents' cabin. "Did you say beer?"

"Holy tripe! now we're wrecked sure," bawled the captain. "I thought you had them engines reversed. You're a healthy engineer, you are. You knock-kneed old Fiji."

"Stop gettin' pusonal, cap, or I'll break your back. Ain't I goin' to see 'bout them engin's right away? I guess they're reversed any way."

"Well, why didn't you say so? There goes the cask past the stern now. Turn the engin's round again, and s'pose you sit in the engin' room for a change."

"All right, cap," answered the engineer, as he hitched up his overalls and returned to the engine room; but he hadn't been there more than five minutes before the old hulk began to jump around like a billy goat.

"Give us a rest on that now," yelled the captain. "I'm sick of you foolin'."

"Shut up, cap," said the engineer. "I'm only seeing how many times I can reverse the engine in a minute. It's monotonous down here; and can't you let a feller do a little sumthin' once in a while?"

"No; I can't. Now, you've got to stop your darn fooling, any way, or I'll tell— Oh, great heavings! The whole boat is a goner. There comes part of the Freshman navy, and they've been layin' to sink us for a long while. Quick, around about, harraye there! Cut loose the keel. Hurry up, then kick a hole in the boiler. Hurry up, then, you flat footed Malay. Shove every passenger overboard. It's the only thing to save us. Take a reef in the smoke stack, and a whole gang of reefs in the cook stove. Do yer hear me? Then, quick now, cut away the rudder and the left paddle wheel. The boat must be saved."

But before these orders could be executed it was discovered that it was not the Freshman navy after all, so we proceeded on our voyage.

It wasn't very long before the captain's hat blew off, and the tug was put about and tied to a shad pole, while the boat was lowered for the hat. After this was obtained, we once more proceeded, but very cautiously, being very careful not to get any of the swash from a tug boat, as it would have swamped us sure. The engineer's vest got caught in the machinery at one time, and the whole concern had to stop and get that out, then we had to wait for several boats that were entering the Narrows, and at one time we came within an ace of running into a floating log, and if we had struck it, we would have gone to the muddy *terra firma* very shortly, because the cohesion between the different portions of the Rumsey is not as great as it might be, and the force of such a shock would undoubtedly have destroyed the cohesive force entirely and the Rumsey would therefore have fallen apart. It was on this account that the cask was so much feared. We entered the slip after the usual club footed fashion, and proceeded on our way to the Institute, where we met new troubles, and if you ever try a Rumsey trip, you will find quite enough trouble in that to satisfy you. Even the employees of the Rumsey are wont to sing, when a trip is finished, this charming little hymn:

Safely through another trip
Has been spared this aged scow
Safely now within the slip
Calm and peaceful rests it now.

{ Dodle E Doob D Dirt—^{8va.}D

and we believe that they have reason
so. T.

ENGINEERING NOTE

THE ORIGIN OF RAILROADS IN I

When the Baltimore & Ohio Railroad first opened, in 1830, from Baltimore to the city, the cars were drawn by horses. Locomotives had not yet come into use. Mr. Thomas, a gentleman of Baltimore, constructed at this time a sailing car, which ran successfully up and down the river, propelled by the wind. The "Eolus" car was named, was often called upon for scientific excursions many passengers of distinction. The Baron Krudener, Envoy to the United States, on one of his trips made the trip, trimming the sails himself. On the return he expressed himself as being delighted with the behavior of the car. Mr. Philip E. Thomas, president of the road, hearing of the intense pleasure which the baron had given the baron, concluded to make a present of one of the same design. He constructed another, therefore, and had it run with the friction wheels invented by James Watt, of Baltimore. This he presented to the Russian envoy, and accompanied it with several reports that had been published in the company, to be sent to the Emperor of Russia. In answer to this high compliment, the emperor wrote: "The nature and importance of this great undertaking to which you have devoted your exertions cannot fail of giving a high degree of interest to the documents relating to its origin and progress; and I do not doubt that his majesty will find them, as well as the ingeniously improved principle on which the car is constructed, deserving of serious attention."

After a short period had elapsed, a report was received, introducing a deputation of scientific men from Russia, who had been appointed by the Emperor to visit the United States. Without delay, these gentlemen entered upon a minute examination of the division of the Baltimore & Ohio Railroad, and all the machinery used upon it. On their return to St. Petersburg, the deputation communicated such valuable information as was accurate, relative to the construction

management of the railroad inspected by them, that the Emperor extended an invitation to Mr. Ross Winans, of Baltimore, to superintend in Russia the construction of machinery for the extensive railroads then contemplated. Mr. Winans accepted the invitation, and, in the words of a well informed writer, "There is no doubt that the early introduction of railroads into Russia originated in the disclosures made to his court at this time by the Baron de Krudener."

It would be interesting here to give in part some of the remarks made by Mr. Thomas, president of the Baltimore & Ohio, concerning the effects which the railroad system would produce. In connection with the extension of the railroads in Russia, as well as in the United States, he said: "Should our present anticipations of the efficiency of railroads be realized, a total change will be brought about in commercial and social intercourse in every country where these roads may be introduced; that experiments already made had demonstrated them to be capable of affording to an extensive continent the facilities of intercommunication now incident to a small island; and that the discovery promises greater advantages to Russia and to the United States than to any other countries." The sound judgment of Mr. Thomas is here displayed, for there is no more striking instance in the world of the debt owed by civilization to the railroad than the rapid growth and progress of our own country. As to Russia, the extreme complacency with which she regards England's frantic efforts to avert a war upon the Indian border, shows the confidence which she has in the utility of her own railroad system, and the power afforded thereby.

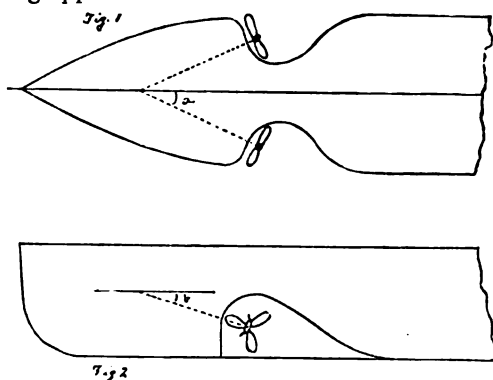
Mr. Thomas further observed that, "should the Emperor introduce railroads into Russia, it would not be many years before a railroad would be constructed between the Baltic and the Black Sea, and that such a road would enable Russia to encircle in her arms, not only the entire northern, but also the eastern frontier of Europe, and thus to greatly extend her power and influence." The foresight of Mr. Thomas was here again conspicuously manifested, for the year 1853 witnessed the completion of a large portion of the great railroads that are so rapidly stretching over the Russian continent. The railroad between St. Petersburg and Moscow was opened in 1852, and its continuation to Odessa, on the Black Sea, was soon in process of completion. It is for the present generation to witness a new era in Russian history, in commerce and industry, as

well as in politics and war, brought on and maintained, in a great measure, by the sole influence of the powerful railroad system.

ALBITAN.

A NEW SYSTEM OF STEAMSHIP PROPULSION.

The invention consists of an improved form and construction of hull, in which provision is made for a novel location and operation of screw propellers in cavities or recesses on both sides of the vessel, thus securing more effectual and certain access of water to the propelling apparatus.



In Fig. 1 are shown the relative positions of the two propellers with regard to the longitudinal line of the ship; in Fig. 2 the dip of the propeller shaft is shown, and these angles of divergence on which the propeller shafts are operated and the location of the propellers in the recesses are the main features of the invention.

These cavities are located about one fifth of the length of the vessel aft of the bow, and are formed of curved surfaces so proportioned and arranged, with regard to the divergent engine shafts and propellers, as to guide by the forward curves the incoming water directly to the most effective line of propulsion. The after curves direct the disengaged water in the diverging lines of the shafts, thereby relieving the pressure at the bow, and at the same time producing an outward reaction from the stem toward the midship, thus greatly reducing the skin friction of the vessel. Experimental tests indicate that this reaction is about 20 per cent.

The effect of this combination of propellers with such cavities is to produce a downward, rearward, and outward reaction. The oblique thrust across the longitudinal line of the vessel is similar to that made by a fish in swimming.

A left screw is used in the starboard and a right screw in the port recess.

The invention also does away with the long and cumbrous shaft of the ordinary steamship, and the propellers being always under water, there can be no racing of these, as is the case when they are placed in the stern.

It is also valuable as a means of steering in case the rudder should break, as well as greatly increasing the facility of manœuvring the ship.

A yacht is now in process of construction which is to be thus propelled, and a thorough test of the merits of the invention will accordingly be made. Her dimensions are as follows:

	Feet.	Inches.
Length over all.....	60	
Moulded beam.....	9	
Draft on even keel.....	3	8
Displacement.....	20	tons.

The angle of divergence corresponding to *a*, Fig. 1, is 15°.

The angle of divergence corresponding to *b*, Fig. 2, is 10°.

The propellers, three bladed, are of 29½ inches diameter, having an entering pitch of 3 feet and a leaving pitch of 4 feet, each to be driven by a rotary engine attached directly to the shaft.

These engines are to develop 115 horse power apiece, and to be operated entirely independent of each other. Steam is to be furnished by a "Ward" boiler at 150 pounds pressure, the boiler having previously been subjected to a hydrostatic pressure of 300 pounds. The plan of the above vessel may be seen at the office of the inventor, Z. Zoram, M. D., 18 Broadway (Welles Building), New York. The invention has been patented in all Europe, Asia, Australia, United States and Canada.

THE PREPS. OUGHT TO GO!

It happens, in the course of events, that the I. P. Co. must shift its quarters. The ever advancing prep. has at last come over us, and we must light out. In derision, they repeat our faded out war cry, "The preps. must go," while they watch us pack up our possessions and prepare to light out. They must have our sanctum, they declare; the edict has gone forth, and so must we. But, we will still cling to the friendly halls of the Institute, which so kindly nurtured us while we were still weak. For it must not be thought that we are not now strong; we are but weaker than prepdom; and in this we are but on an equality

with the Institute itself. When preps tends itself over that, then shall we not until then.

AN INVENTION!

The following is a *fac simile* of a postal card sent to the *Iron Age*, and in all good faith by a genius from West:"



*editor iron age. I
you may put it
in your issue if
i have perceived
style of steam
do ing in. No ex
or anything of the k
also a new d.
steam governor.
do n. Reels. P. d.
perception for sa*

The editors of the *Iron Age*, a conservative paper, felt some delicacy in publishing so revolutionary a communication, kindly forwarded it to the *INDICATOR* latter, being a more radical sheet, hesitating in revealing the astonishing discovery.

The Stevens Indicator.

PUBLISHED ON THE
15th OF EACH MONTH, DURING THE COLLEGE YEAR,
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Subscribers will please immediately notify us of any change in their addresses or failure to receive the paper regularly.

The writer's full name, as well as his NOM DE PLUME, must accompany the article, as assurance of good faith and reliability; but it will not be published, unless desired.

Exchanges, contributions, subscriptions, advertisements and all other communications by mail, should be addressed to THE STEVENS INDICATOR, Stevens Institute, Hoboken, N. J.

IN the microcosm of sportive college life, just as in the outer world of stern reality, the same sentiment prevails as regards the men whom unrelenting fate forces to bid farewell to old associations that they may attempt to live another and unknown existence: *De mortuis nisi bonum!* So let it be in our case!

The Class of '85 is about to leave us; her death-knell is being sounded. Commencement—the threshold is crossed, and naught but their names and eminent examples will glimmer forth in the darkness for men of future ages, aspiring to that great honor of becoming true sons of our Alma Mater. But is it possible that '85 will be altogether dead to Stevens? If we may judge from present appearances, the men of this class will not forget the place where they had endeared themselves to everybody. In their struggle for existence, while toiling for the daily bread in obedience to the common doom of man, let them occasionally cast their glances in this direction, and let them lend their aid with heart and hand, whenever they find STEVENS in need.

Success has attended the class of '85 in all its undertakings; in athletics, it has been

foremost; in music, it has taken the lead; at socials, it has distinguished itself; and last, and according to some least, in study it attained a high degree of perfection. But, it too must go; its men, too, having tasted of the fruit of knowledge, must abandon the paradise of college life, that *dolce far niente*, for a cold, unsympathetic, Philistine world. It must, however, be remarked with full justice, that they go not unprepared to fight the battles of life; they are armed in point of theory as well as practice.

Stevens Institute, like a provident mother, stocks her children well before she sends them away to shift for themselves. So let them go forth to the dingy, smoky factory or workshop, where they can devise and build new machinery, that grand exponent of the power of man's mind! Let them go forth and triumph over every opposition; make slaves of the gigantic forces of nature, and cast in bondage the elements themselves!

And, as we bid them farewell, let us ardently hope that success may attend them in the future, in order that they may do honor to the name of graduates of STEVENS.

THE present number of the INDICATOR, the official journal of the Stevens Institute of Technology, completes the sixth number issued by the great monopoly, the "I. P. Co." From a poor, forlorn few, beseeching help, the company has become, by dint of judicious wire-pulling, a thriving corporation. From its present prosperity, it is evident that the proper chord has been struck in the hearts of the students, their support coming unsolicited and in such an amount as to warrant the stockholders to dream of still larger dividends in the future.

To-day we enlarge our issue, and in addition to the contributions from the company, we take pleasure in acknowledging several from interested friends; and we make the effort to present an unusually attractive number, not to make a parade of our unbounded wealth, but in honor of our departing Seniors.

We devote another space to the class of '85, and will note a few more points in the growth of the INDICATOR.

The Alumni editor is still at large, but we hope the association will take some definite action at their meeting this week. We are unable to offer any selfish inducement to the editor from the Alumni, as our dividends are only divisible by fifteen, but we hope that the love for Stevens and a desire to see this enterprise still more prosperous, will be a sufficient incentive to induce some member to accept the position.

The dividend lately declared, although unprecedented in the history of corporations, for its volume, is still within the imaginative scope of the stockholders, and in order to follow out our purpose, which is, as set forth in Article XXI. of Constitution, a "grasping after the unattainable," we must still progress, receive more subscriptions from the students, and if it be possible, a more hearty support.

THE INDICATOR learns with much regret the fact that Prof. Carr is about to leave the Institute. Since coming here in 1882, he has made many friends, and has filled the position of Professor of Marine Engineering, a department created by him, and one calculated to tax the abilities of a young man to the utmost, in a very able manner, and his lectures have been of great benefit to the men who have been fortunate enough to come under his instruction. As assistant to Prof. Wood, he has supplied a want which had existed for several years before he came among us, and which was becoming very urgent about the time of his appointment, and his work in that department is worthy of great praise. The INDICATOR has cause for much gratitude toward him, for when the paper was in its infancy, and was looking about vainly in search of some place which it could call its own, he stepped in and with great kindness gave up half of his office as a sanctum, and this at a time when its presence there must have been very annoying to him.

While his departure was not wholly expected, it will be received with deep regret by his many friends here, and we can only hope that he may find it for his best interests to turn and resume his old position.

WE take pleasure in presenting this a highly interesting article from the pen of Prof. Thurston. The article, as indicated by its title, "Stevens and her Faculty," commands the interest of all. We insert it as originally designed with reference to the tower. The building, as it is now, was finished off with the tower base, but with provision for its completion at some future time. The present is taken from an old journal published shortly after the building of the Institute.

S. I. T. GLEE CLUB.

The concert given on May 13, in Brooklyn, was a very creditable performance. The warbling of Mr. Brainard, the solos of Mr. and Mrs. Burhorn, the banjo playing, as in every event of the evening, were favorably commented upon by the Brooklyn Club. The joint whistling of Messrs. Koll and Schlesinger was a decided "hit;" we trust that their repertoire will be increased, at the next concert, to more than two numbers, in order that they may display their power to better advantage. The Polytechnic orchestra also showed a proficiency far in advance of any ordinary amateur performers. It is a living proof of what even busy, overworked students can do if they only set themselves about doing a thing with spirit and energy. Stevens ought certainly follow the example of the Polytechnic by uniting the now scattered musical talent into one whole. Our club is one step in that direction; the next will undoubtedly soon follow.

The concert for the benefit of the Association will be given on Tuesday evening 16, at Odd Fellows' Hall. The program for that evening has been changed, and new songs will rouse the echoes of the hall for the first time in Hoboken.

The club will need a good many reinforcements of its best and most energetic members, leaving with '85. The banjo club also

have to become popular among the class men, if it is desirable to have it become a standing institution.

In college life, just as in the outer world, it appears at first view that men, who having run their course pass out into another existence, are irreplaceable; but invariably it is found that posterity pushes forward men fully as able as their predecessors. Let us hope that that will be the case at present.

SOCIAL.

As the college year draws to a close and the alumni turn toward their Alma Mater, and the students gather to bid farewell to those whom they have revered from afar, the Seniors, it becomes our pleasant duty to chronicle in a few brief words those events which have tended in some measure to relieve the careworn brains of our Seniors and Juniors.

First of all we touch a vibrating cord in every alumnus' heart when we speak of the usual receptions tendered by the professors and their wives to the two higher classes. As is eminently fitting, Prof. Thurston's name heads the list in both chronological and favorite order. His first reception occurred on January 30, upon which occasion the Senior Class was received by Mrs. Thurston, assisted by Miss Thurston and Miss Boughton. The glee club made its first appearance, and was well received.

The following week the members of '85 betook themselves to Prof. MacCord's residence, where they entered heartily into the games and card playing, which caused the evening to wear away so rapidly. The only tabooed subject was kinematics, it being generally known that the Seniors finished that branch last year.

Shortly after this, Prof. Wall, wishing to show his high estimation of the class of '85, but noticing the effects of so much recent dissipation upon their countenances, invited them to an afternoon tea. This was largely attended. Several of the faculty with their wives graced the occasion. A particular friend of ours remarked that she "had expected to meet some rough young fellows covered with oil and iron filings," whereas '85 didn't appear any different from the dudes of any other college. [As the class graduates, we shall not suffer from their arrogance after reading this.]

Meanwhile '86 had been looking on at all these entertainments with an envious eye (if '86 ever could be envious). Now, however, Prof. Thurston decided that it was time to

become acquainted with next year's Seniors, and accordingly, on the thirteenth of February the Junior class assembled at his residence to become more intimate with their professor, as well as to be presented to a number of Vassar young ladies, who had accompanied Miss Thurston down from Poughkeepsie "*especially for this occasion.*"

But Stevens society had still another claimant for its attention, and this originated with the Seniors. Early in the winter they put their heads together, and as a result there sprang into existence the "Stevens Senior Social." This very select organization gave a number of hops during the winter, thus enlivening Hoboken society in a great degree. It needs hardly be stated that this new venture was a success, and it remains for '86, when her turn comes, to follow the good example set by '85.

The students of the entire college received invitations to meet President Morton and the Faculty at the Trinity Church Guild. A large number of the students were present. This reception may also be mentioned as tending to show that at least a few outside of the college are interested in her social welfare.

In writing out this little history we have come to a place where it is necessary to use capitals: THE GLEE CLUB IS A GRAND SUCCESS! Reorganized, as it was last fall, under the leadership of Mr. Camp, of Wesleyan, it has become decidedly popular, not only in Hoboken, but also to a less degree in Brooklyn.

Thus we have come to the end of the year's work, shortened by the gayety which has just been described. Sadly we remember that the pleasant lot of describing the festivities of Commencement Week will fall upon other hands. However, when we see before us prospects of some day enjoying those very pleasures which we are now content with describing, we not unwillingly give up the lesser joy for the greater, and surrender the pen to our successor. May the social events of the coming year be so manifold that our successor will grow weary of reporting them! C.

A FUNERAL DIRGE.

Oh, water bath! water bath! Why art thou gone
From under the hood? Was the draught too strong?
Oh, water bath! water bath! Whither away?
Doth any vile Junior oblige thee to stay?
Oh, water bath! water bath! Come back to me!
Confide to thy warmest friend what made thee flee.
Oh, water bath! water bath! Gone, gone, forever!
Revenge will be sweet! Forget thee? No, never!!
Da capo al infn.

COMMENCEMENT WEEK.

The Class of '85 has done well in preparing to follow the brilliant example set by the Class of '84, in regard to carrying out an extended programme for commencement week. Equally extensive preparations have been made this year, and the Seniors hope, if possible, to improve on the past year's programme.

The week will commence Sunday, June 14, with the baccalaureate sermon by Prof. Edward Wall, A. M., in the First Presbyterian Church, corner Sixth and Hudson Streets, at 3 o'clock p. m.

On Monday night, Prof. and Mrs. Thurston will hold their final reception to the Senior Class.

CLASS DAY.

Class Day exercises will be held the following day, Tuesday, commencing at half past two in the afternoon. Mrs. Stevens has again offered the free use of Castle Point for the occasion. The opening address, by the president of the class, will be followed by the class oration, delivered by Mr. Henry Abbey. The class ode will be presented by Mr. Paul Hussey.

Pipes having been distributed, Mr. Arthur Glasgow will deliver the pipe oration, at the end of which the class will unite in the singing of the pipe ode. One of the most amusing and interesting features of class day exercises in general is the giving of personal hits, or "grinds." These will be given by Mr. Anson Burchard, and will close the exercises at Castle Point. Then the grand march to the college campus will take place. After the solemn ceremony of planting the ivy against the wall of the Institute, Mr. William Adriance will give the ivy oration. Then follows the class history by Mr. Lewis N. Lukens, which traces the various successes (there have been no failures) of the class during its four years' course. Mr. William Dilworth will deliver the farewell address. Music will be furnished by the Glee Club and by an orchestra.

The programme distributed is as follows:

PROGRAMME.

OvertureOrchestra.
Opening Address.....HARVEY DANIEL WILLIAMS.
Class Oration.....HENRY ABBEY.
Selection.....S. I. T. GLEE CLUB.
Class Ode.....PAUL GORDON HUSSEY.
Selection.....Orchestra.
Pipe Oration.....ARTHUR GRAHAM GLASGOW.
Pipe Ode.....CLASS OF '85.
Grinds.....ANSON WOOD BURCHARD.

GRAND MARCH TO COLLEGE CAMPUS.

Ivy Oration.....WILLIAM ALLEN /
Selection.....S. I. T. GLEE CLUB
Class HistoryLEWIS NEVINS LU
Farewell Address.....WILLIAM S. DILW
Selection.....Orchestra.

At eight o'clock on the evening of day, the Glee Club concert will be held in Odd Fellows' Hall. No effort has been made to make this the most successful affair of the Glee Club this year, and the programme will embrace the most pleasing and selections suiting the occasion. The concert is under the auspices and for the benefit of the Athletic Association; and the proceeds will be used for building dressing rooms and grounds. At the conclusion of the concert the Senior Class will assemble at Mr. Morton's to enjoy their class dinner.

COMMENCEMENT DAY.

The Alumni meeting will take place as usual, in Prof. Thurston's lecture room. President Wm. Kent, '76, and secretary Trautwein, '76, will officiate. The subject to be brought up for discussion, which has been mentioned in the INDICATOR, is the question: "What changes should be made in the curriculum of the Institute?" Members cannot be present at the meeting but are requested to send their suggestions in writing.

President and Mrs. Morton will hold their annual reception to the students, in the evening, at the conclusion of the alumni meeting. At half past six o'clock, the alumni will take of a supper at the Park Hotel.

The thirteenth commencement exercises will occur in the First M. E. Church, on Livingston Street. The order of exercises follows, interspersed with selections of music.

ORDER OF EXERCISES.

Introductory Remarks.....PRESIDENT MORTON.
Salutatory Address.....JOHN MORRIS.
Address to Graduating Class.
Conferring of Degrees and Announcement of Valedictory Address.....CLAYTON ALLEN.

The Graduating Class this year consists of 36 members.

GRADUATES AND SUBJECTS OF THESES.

Graduates Receiving Degree of Mechanical Engineer.

HENRY ABBEY, Ohio.

OSCAR HOWARD BALDWIN, N. J.

Report on Trial of Locomotive No. 169, N. J. (Trial on Regular Trips, Hauling Trains over "Bound Brook" Route)

WILLIAM ALLEN ADRIANCE, N. J.

Mowing Machinery. (Including Experimental determination of Resistance.)

ALTER JOSEPH BROADMEADOW, N. J.
PAUL WILLIS, N. J.
sers for Steam Engines: Theory and con-

EDWIN BURHORN, N. J.
NORTH MCLEAN, N. J.
," Boilers. (Results of Trials to Determine)

ANSON WOOD BURCHARD, N. Y.
LEON GREENEBAUM, CAL.
Machinery in the Manufacture of Fur Hats.

WILLIAM THOMPSON CLERK, N. J.
gineering of an Internal Ship Basin: Original

BARTON HAXALL COFFEY, N. Y.
JOB ROCKFIELD FURMAN, N. Y.
ry Engine and Boiler Test. (Experimental tion of efficiency.)

WILLIAM HERMAN CORWIN, N. J.
al Motors: Commercial Economy of Systems.

WILLIAM S. DILWORTH, N. J.
CHARLES EMMET MACHOLD, N. J.
of Engines of Penn. R R. Tug Boat "Dela-

ERNEST DREYSPRING, ALA.
r Machinery: Construction and Operation.

FREDERICK FISCHER, PA.
and Engine Test. (Report on Trials.)

ARTHUR GRAHAM GLASGOW, VA.
RICHARD HENRY RICE, N. J.
Plant for Cotton Mill. (An Original Design.)

PAUL GORDON HUSSEY, N. Y.
on Engine and Boiler Test.

LEWIS NEVINS LUKENS, N. J.
d Fuels. (Commercial Values and Devices g)

SIMEON MARTINEZ, MEXICO.
on Performance of Two Saw Mills and their tors (Steam Engine and Water Wheel).

JOSEPH SYLVESTER MCCOY, D. C.
ission of Energy by Electricity.

EDWARD HERMAN MUNKWITZ, WIS.
VILLIAM HERMAN MUNKWITZ, WIS.
on Test of Pumping Machinery.

ROLLIN NORRIS, MD.
of Watts, Campbell & Co.'s Corliss Engines.

CLAYTON ALLEN PRATT, ILL.
HARVEY DANIEL WILLIAMS, PA.
and Construction of Governors for Prime

JOSE CHARLES RENDON, ECUADOR.
Plan of Workshop. (Original Design.)

WILLIAM WHITTEN RENWICK, N. J.
Fire Proof Materials.

JOHN MORRELL RUSBY, N. J.
WILLIAM NORTON STEVENS, N. J.
Leading Points in Locomotive Construction and Performance.

ALBERT ANTON AUGUST SILBUR, N. J.
Hoisting Machinery.

THOMAS GARDNER SMITH, OHIO.
Experimental Determinations of Efficiency of Gov-
ernors.

WILLIAM HARVIE WADE, VA.
Steam Engine Efficiency.

JOHN FRANCIS WILKES, N. C.
Fitting up and Management of a Machine Shop.

The following are the prizes annually
awarded:

The Priestly Prize, for commendable work in the De-
partment of Chemistry.

The E. G. Soltmann Prize, for excellence of work in
Mechanical Drawing.

The Wm. A. Macy Prize, for highest standing, during
the Freshman year, of student entering from Hoboken
public schools.

RECEPTION COMMITTEE.

EMILE M. COTIART,	CHARLES R. COLLINS.
CORNELIUS J. FIELD	HENRY K. MORRISON,
EDWARD P. MOWTON,	WILLIAM RANDOLPH,
EDWARD D. SELF,	EDWARD F. WHITE.

At the close of the exercises the Senior
promenade will take place at the German Club
House.

The invitations issued are neatly drawn by
Mr. Williams. The design consists of a plaque
on which is represented a steamer going
to sea; about this are the words, "STEVENS
INSTITUTE TECH." Under the plaque to the
left side is a medallion with the monogram of
S. I. T., under which is a spray of spruce
crossed by a spray of clover leaves and a
flower upon which has settled a bee. The
meaning of the spruce is "farewell," while
that of the clover is "industry." Whether by
this the class mean that when they leave the
Institute they thereby bid farewell to industry,
or that in bidding farewell to the class the In-
stitute loses its highest example of industry,
is not explained. If any of the members of
the class should be asked concerning it, we
are inclined to think that they would give the
latter solution.



BASE BALL.

The base ball team needs no more criticism ; the batting averages, given below, will show in *part* what was needed, and were we able to the fielding averages, too, perhaps the main reason for our record this year would appear. We are glad to see the improvement toward the end of the season, and hope it will show earlier next year.

NAMES.	Times at Bat.	Total Bases.	Averages.
Morrison.....	33	18	.545
Aldridge.....	34	8	.235
Sevenoak.....	28	6	.233
Whigham.....	30	7	.214
Hart.....	31	6	.193
Du Common.....	25	4	.160
Pattberg.....	16	2	.127
Coen.....	16	1	.062
Harvey.....	21	1	.047

LACROSSE.

The review of the lacrosse season has been given elsewhere, and we now give the record of the games. They speak for themselves, and should give Stevens a great deal of encouragement. The games are not given in the order in which they were played, or the great improvement made as the season progressed would show more clearly. Let us hope the improvement will not stop here, but carry "Stevens" near the top of the League.

New York Lacrosse Club vs. Stevens.....	5	....	1
New York University " ".....	4	....	0
Williamsburg " ".....	5	....	0
Williamsburg " ".....	5	....	2
Druids, 1st, " ".....	4	....	3
Druids, 2d, " ".....	0	....	3
Lehigh " ".....	0	....	4
New York University " ".....	3	....	2

Total points gained by opponents, 26 ; Stevens, 15.

With the tournament held on Decoration Day, the lacrosse season at Stevens is practically at an end, though at the time of writing this we have still before us a postponed match with New York University.

Reviewing the work of the past spring, we have every reason to congratulate ourselves

upon the progress made. Improved lack of it, is the standard by which the of a team should be gauged, and not the score of games. This fact seems been appreciated in the college genera I take this opportunity of thanking th bers of the Institute for the cordial support which has generally been exte us. Of course, there are always a few tutional growlers who are never satisfi who make a point of making the m couraging remarks ; but, in spite of th have progressed, and are now establish firm footing.

Of last year's team we lost four by tion, and three others, members of '8 been unable to play this season on acc thesis work. This, of course, weak very seriously, and the outlook at first very gloomy. During the autumn, h several men managed to get in a little p and later, when the meadows froze, a of new men played on the ice, and tho had no regular games, the practice wa greatest benefit in teaching the boys handle their sticks.

Toward spring, when Hexamer's ha secured for base ball practice, almo some three or four of the lacrosse men avail themselves of the opportunity of ing their catching and short throwing good effects of this preliminary traini very evident when the weather permit of-door work.

During the season we have played matches, of which we won two. Ou nents scored twenty-two goals to our f In one game only have we been white

Of the present team we lose this ye two by graduation, and, with an en captain, we ought next year to be nearl quite, at the head of our local league, of at the foot, as we are this year.

The management of the team this has been faulty, in not having enough games. This has been partly due causes : one was the reluctance to i with such of the base ball men as we the upper end of the grounds, and tl was the difficulty of getting together men at any one time to form two sides that so many have sticks, I hope that cessor will have less trouble in this la rection, and the rudiments of the gam now somewhat familiar to the team, I him the task of teaching them the refi and possibilities of lacrosse.

ROLLIN NORRIS, Ca

SPRING GAMES.

We give below a result of the spring meeting. Some of the results, obtained as they were with no training, show that there is some

excellent material at Stevens, and we hope next year to see more training and better results. The time made by Isaac in the 100 yards dash was not allowed, although both time keepers agreed.

EVENTS.	WINNER.	SECOND.	TIME.	
100 Yards Dash.....	Isaac, '88.....	Lyall, '88.....	.....
220 Yards Dash.....	Cotiart, '86.....	Aguilera, '86.....	26½ sec.	
One Quarter Mile Run.....	Isaac, '88.....	Crisfield, '87.....	57½ sec.*	
One Mile Run.....	McLean, '88.....	.....	5 min. 23½ sec.	
One Mile Walk.....	McLean, '88.....	Fuller, '88.....	8 min. 43 sec.	
Three Legged Race.....	Isaac and Hawkins, '88.	Quimby and Wheatley, '87.	14 sec.	
Sack Race.....	Rickoff, '88.....	.....	43 sec.	
Running High Jump.....	Greenebaum, '85.....	.....	Feet.	Inches.
Standing Broad Jump.....	Isaac, '88.....	Glasgow, '85.....	5	0
Running Broad Jump.....	Crisfield, '87.....	Herring, '88.....	9	10*
Hop, Step and Jump.....	Greenebaum, '85.....	Crisfield, '87.....	18	1
Throwing Lacrosse Ball.....	Flack, '87.....	Burhorn, '85.....	38	3½
Throwing Base Ball.....	Morrison, '86.....	Finch, '89.....	289	0
Kicking Foot Ball.....	Kletzsch, '84.....	Adriance, '85.....	311	3
Putting Shot.....	Kletzsch, '84.....	Adriance, '85.....	168	6
High Kick.....	Herring, '88.....	Adriance, '85.....	31	8½
			8	3½*
Tug of War..... { '87 vs. '88.....'87 Team won by 3 inches } Final, '86 vs. '87; '86 won by 4 inches.				
{ '85 vs. '86.....'86 Team won by 4 inches }				
Class '85, Events Won, 2; '86, 3; '87, 2; '88, 8. * Stevens record broken.				

POLO.

The Polo Club has done excellent work this spring, and the team is one of which Stevens ought to be proud. The team had the misfortune of being compelled to play under unfair referees, or the results would have been even better. Below is a list of the games :

Hoboken	vs. Stevens.....	0	.....	0
Somerville	" ".....	0	.....	0
Hoboken	" ".....	1	.....	2
Somerville	" ".....	0	.....	1
New York	" ".....	1	.....	1
Metropolitan	" ".....	0	.....	1
Hoboken	" ".....	2	.....	2
Pavonia	" ".....	0	.....	3
Pavonia	" ".....	2	.....	1
Crescent	" ".....	0	.....	2
Hoboken	" ".....	0	.....	0

Totals won : Stevens, 5 ; opponents, 1 ; drawn, 5.

Priest : " The devil'll have you sure, Pat, if I hear of you being drunk on Sunday."
Patrick : " Rest aisy there, yer riverince, for it's only last night I dramed I saw his honor, St. Peter, and his riverince, the devil, a-chuckin dice fur me sowl. 'Dad, how I shivered whin the devil got double sixes! 'Fin miricles, Peter,' sez he. 'Ye spoke too late,' says Pater, as he chucked *double sixins*."
—Spectator.

PERSONALS.

'76.

E. P. RAQUE is in New York.

'77.

MAURICE I. COSTER has received six months' leave. He is now travelling through the States, preparatory to going abroad.

E. P. ROBERTS was present at a meeting of the Institute of Electrical Engineers, and read his paper on "Storage Batteries."

E. A. UEHLING is the inventor of a gas seal for blast furnaces. He is having his patent put on a furnace at Sharpsburg.

'81.

H. C. WHITE is in charge of the New York office of the Payne Engine Company.

'84.

A. SAUNDERS MORRIS has returned from Europe.

F. VAN VLECK visited us last month.



Toasts in order !

'85—The Going, going, gone !

'86—A HAPPY New Year !

Vacation is a tiptop time !

Hot sodium and water are bad things for *Christians* to play with.

In many cases Freshman is decidedly a misnomer, Freshboy being more appropriate.

The Senior thinks, while M. E.
Behind his name is pinned ;
"That I might have a sheepskin
"A skinny sheep was skinned."

Do not fail to make yourself acquainted with the features of the celebrated albino of '88.

It can be demonstrated mathematically that an engine is "off its base" when it is "on its centre."

That suits me square to a T, said the student as he "borrowed" somebody else's T-square.

When a photographer gets shook by his best girl, may he be said to have developed a negative ?

This is a degenerate age. One of the "preps." dared to flaunt a giddy cane in the faces of the Sophs.

Now is the time for the Freshmen who were dropped during the year to hang around and swindle '89 with Hawkrider's tools.

One of the Preps, speaking of the quality of the tobacco smoked by some of the Seniors, said that even the Freshmen were obliged to close the doors.

Physics and French mixed :

Student translating: "But here comes *Ozone*, he will bring, etc." (Accompanying electrical discharge from the rest of the class.)

A moke and a representative of the Emerald Isle, both of very tender years, were seen about the Institute a few days ago. It is suspected that they are candidates for '89.

"Come on, Sam, let's go down to Busch's and get a glass of milk." (Cox.)

'Man wants but little here below,
But wants that little *strong*."

The INDICATOR offers a prize of 1,000 cents for a bran-new subject for witticism, warranted to last a year, its stock-joke-cow, O'W. J. refusing to yield any other than stale milk.

The drawing rooms have lately been kept locked whenever they were not used by any of the classes. Is this precaution expected to prevent the absconding of tacks, T-squares, etc. ?

The Juniors are considering the advisability of changing the design for their class pin. A winged water bath is seriously advocated by some, as being more appropriate than the bird of Juno.

"I have a case against you," said the Soph. to the purp, when he had locked him in the show case.

"Don't mention it," said the purp. "I can howl my own."

At the concert in Brooklyn, the glee club seemed to be somewhat in doubt as to whether George Washington was the father of his country or not, so they had to go back and argue the question all over again.

After a life of nine months at Hoboken, the Freshmen have lost their aforetime verdancy. That is what the juniors thought, so they turned the fire hose on '88. However, the class pictures were a great success.

"Do you play cards?" asked a Sophomore of a Freshman, the other day. "Oh, yes! we have 'em every day in Math." "Indeed! what game do you play?" "Cribbage." "Ha—hem! How quickly they learn."

Professor: "Can you tell me something about Francis Parkman!"

Soph.: "Did he write histories?"

Prof.: "Yes."

Soph.: "Well—ah—he wrote histories."

During the trip to Troy, one of the members of our base ball team ordered what he called a hearty meal. The waiter, evidently a novice, surprised the party hilariously, by asking very blandly: "How many is that for?"

professor of Chemistry, while walking lecture room, found a large pumpkin lying in his path. He calmly picked it up and showed it forward in front of the assembled students. The professor, showing the fruit, said, with his eyes fixed on the pumpkin: "One of the students has lost his

... etc.'s, number elevens have flourished wonderfully last term, and he now sports a pair in '87. They have assumed the shape of a tractrix, and are tangent to an asymptote somewhere in the vicinity of his head; but as we could not find that, we must be at infinity.

Endeavoring to explain to the preps. the difference between *shall* and *will*: "What is the principal difference?"

PREP.—"Please, sir, I know."
"Well, Johnny, my boy, what is

Why—why, sir, they're spelled dif-

ferently," says, that "St. George" has the shape of a good trotter, and only needs a little to fit him for the track. He will run him an "alf" mile against the B—ss or J—hn C—x. J—hn says, that some one will have to carry a pail round the track, so that he can get a drink in a while.

The Juniors asked for and obtained a bill for chemical apparatus bought; and having recovered from the transitory excitement upon his perusal of aforesaid bill, his mind seemed "visibly affected." The enormous profit tempted him to the glass blowers' business.

"Where ignorance is bliss," etc.,

... since from a long suffered evil is now a new '88 has organized a navy for the purpose of cultivating biceps, dorsal, and other tissues, and of exterminating the Rumsey and the Weehawken. The members of the navy are becoming proficient in the management of their vessels, and it is expected that the James Rumsey will be destroyed at the bottom of the Hudson before the end of the term.

... a machine shop:

"Hey, there; what are you moving with that crowbar for? Don't you see you're getting it out of line with the main

FRESHMAN.—"You told me to do it, sir."

M. L.—"I told you to do it! What did I say?"

FRESHMAN.—"You said to set my lathe over so as to turn a taper, and I'm a-doing it."

The detective who was intrusted with tracking up the water bath, that has recently been mean enough to escape without any apparent cause (the professor says he always treated it with extreme kindness, or rather water, whenever it was dry), has found no clue as to its whereabouts. The man that accompanied the W. B. in its flight more than likely needed one. What will become of our professor if he cannot enjoy even the pleasures of a water bath unmolested?

If you wish to flatter a Senior and to pay him a compliment, show his so called photograph around, and tell everybody it is a perfect *counterpart* of him.

The student goes; his heart's not over sore;
He takes his trunk and leaves the Jersey shore.
Mudsummer comes, of all its charms bereft.
How cold the day when Hoboken is left!

The Senior smokes his farewell pipe, and drinks his farewell beer,
Then gives his lass a farewell kiss—"Oh do write soon, my dear!"

A messenger boy entered the Institute the other day from Hudson Street, and cast an anxious look about him. Seeing a student in the chemical laboratory, he plucked up courage enough to ask him how he could deliver his message. "Just go outside and ring the bell twice," was the answer. After an interval of five minutes, the Junior glanced up from his work and saw the messenger boy near by, looking at him with extreme suspicion. "Well, Johnny, did you ring the bell twice?" the student asked. "Ya-as," was the spiteful reply, "and I rang it *three or four* times!"

"He who laughs last laughs best"—

Student: "Taking an isosceles triangle for example, it may be a right angled isosceles triangle or — (Class laugh uproariously, and Professor laughs twice as much, only he does not make as much noise.)"

Prof. "Haden't you better modify your statement? Just—just draw such a triangle on the board."

(Student draws the triangle correctly. Great astonishment; and class and professor assume a knock-kneed smile. Student then indulges in a little private laugh of his own. Sneaky music and colored lights.)

Translations from "Die Anna Liese," by Soph. :

Anna, fass dich ! resolut ! resolut ! Ich bin da !

"Anna, compose yourself ! Resolute ! resolute ! I've been there"—

Zeit von 1694-1698. Anna mit einem Rahzeug beschäftigt.

"Time from 1694-1698. Anna, with some sewing machine material."

We always thought the sewing machine was an ancient invention. In fact, we were once told that a man in Plymouth, Mass, had a piece of the old rock, said to have been knocked off by the pilgrims while trying to lug a sewing machine ashore. This fact places its origin further back than the Sophomores.

TRAGEDY IN FOUR ACTS.

ACT I.

The purp comes in the drawing room,
And casts his eyes about :
The Sophs. him spy, and soon their cry
Has risen to a shout.

ACT II.

McKibben, of electric fame,
Then grabs him by the collar ;
His dogship reels, then softly squeals,
And ends up with a "holler."

ACT III.

Professor M— appears in view !
The Sophs. o'er boards bend low.
McKibben works, with steady jerks,
Upon his dynamo.

ACT IV.

Professor then steals softly,
Takes the canine unawares
Through the room, unto his doom,
Which he meets upon the stairs.



One not acquainted with amateur literature would be surprised to know the amount published in this country. With few exceptions, every college has a publication carried on by its students, and many high schools and academies have publications of a similar character. The majority of this class of periodicals are published monthly, and a few bi-weekly. But it is the character and the value of this literature that we wish here to notice.

From so many different sources we must necessarily have the greatest variety of composition and style, and we must often expect to detect in the style and the thought the inexperienced writer and the youthful mind ; while on the other hand we may often be surprised to find much of value in the subject matter, and that so well expressed that the composition may compare favorably with many of those from our standard writers. Many articles in their subject matter show the result of extended reading and thinking, and in their composition great accuracy and care.

It is a pleasure to find much that is progressive and truly excellent in many of our college papers. All encouragement should be given to carefully published amateur literature, and with such we are always happy to exchange. There are, however, papers published for the mere sake of having a paper. In such periodicals there is easily traced a lack of thought and work, and the presence of a hurried and careless style throughout. It is not right that such papers should be allowed in one's sanctum ; and if all college papers were careful to glean from the list of publications only those that show real earnestness to succeed and to improve, the general run of amateur literature would be greatly improved. Suffice it to say, to the credit of American colleges, that the better class of college papers would form the greater list.

THE BOLT.

We have received the "Bolt" for '85, and it affords us pleasure to compliment the managers on its good features. The illustrations are very creditable. The pictures of students in the cartoons are easily recognizable, and this, for a college paper, is high praise. Although the literary portion of the book has the too great fault of brevity, this is partially redeemed by the good quality of contents. One of the best articles is the little poem "Stevens," modelled after "Hiawatha." Although here and there a line is at war with the metre, the composition is an excellent imitation, even to the repetition of idea in successive lines, which is so often noticed in the original poem. The little poem "A Health to '85" is well written, and has a very pretty illustration. Many of the squibs are very good, and the book makes a very favorable impression upon the reader, although we wish that the literary contents were a little more extensive.

2

no p. missing











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Stevens Indicator

November, 1885.

Fig. 8.

—CONTENTS.—

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THE STEVENS INDICATOR.

THE
Stevens Institute of Technology,
SCHOOL OF MECHANICAL ENGINEERING,
FOUNDED BY THE LATE EDWIN A. STEVENS.
—AT—
HOBOKEN, N. J.

HENRY MORTON, Ph. D.,
ALFRED M. MAYER, Ph. D.,
DE VOLSON WOOD, C. E.,
J. SUBKITT WEBB, C. E.,
C. W. McCORD, A. M.,
ALBERT R. LEEDS, Ph. D.,
CHARLES F. KROGH, A. M.,
REV. EDWARD WALL, A. M.,
J. E. DENTON, M. E.,
A. RIESENBERGER, M. E.,
W. E. GEYER, Ph. D.,

President
Prof. Physics
Prof. Mech. Engineering
Prof. Math. and Mechanics
Prof. Mech. Drawing
Prof. Chemistry
Prof. Languages
Prof. Belles-lettres
Prof. of Experimental Mechanics and Shopwork
Instructor in Mech. Drawing
Prof. of Applied Electricity

The course of the Stevens Institute is of four years duration, and covers all that appertains to the profession of a Mechanical Engineer. By means of workshops provided with excellent machinery, Physical Laboratories whose appointments are without an equal, and with the finest Calendars of Instruments, every opportunity for the acquisition of thorough and practical knowledge is afforded. For further particulars address the President.

H. MORTON, Hoboken, N. J.

STEVENS HIGH SCHOOL.

THE ACADEMIC DEPARTMENT

—OF THE—

STEVENS INSTITUTE OF TECHNOLOGY,

RIVER STREET, bet. 5th and 6th, HOBOKEN, N. J.

OPENS SEPTEMBER 16, 1885.

Examinations for Admission on the 14th and 18th of September.

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T H E Stevens Indicator.

HOBOKEN, N. J., NOVEMBER, 1885.

No. 8.

THE LATEST CRAZE.

nt man, S. I. T., 'eighty-five,
'the needful to keep him alive,
iself last July in a very bad way ;
ork from Prof. D. at a dollar a day.
ig, "Since in my pocket a sheepskin I've
ted,
ing to work on the new aqueduct."

ghtway our President that very day
in a hurry with O. W. J.,
led down South fast as steam cars could go,
t fetch up until in Mexico.
ig, "In my valise a new note book I've
ked,
one to get points for the new aqueduct."

er invented a little machine
'twill work remains yet to be seen)
ig experiments very complete,
amount of the earth's latent heat.
ng, "If they dig deep 'nough, I soon will
duct
imetry tests in the new aqueduct."

nd set to work both with might and with main
t improvements on rock drills again.
htly conjectured, when they reached bed rock,
een around him in coveys would flock.
ng, "You must for us some new rock drills
struct,
: we can't do without them on our aqueduct."

near the shanty, called chemical lab.,
id of cobbles, green, yellow and drab,
ped in the midst of all prepdom at play,
infinite joy and poor Donald's dismay,
ing, "I am Prof. Leeds, and these boulders
re plucked
n the very bed rock of the new aqueduct."

ned Prof. Kroeh, just to keep his hand in,
for the sake of the "boodle" or "tin,"
work on the subject ; as yet it's in press—
iter has fooled him, or I miss my guess.
ging, "Gentlemen all, if you are not 'plucked,'
ie day you'll be working on this aqueduct."

urday noon, after some slight reflection, i
all took the preps on a tour of inspection.
ent up to Yonkers to see the great tunnel,
nt down a hole, like an inverted funnel.
ging, as the wet clay in their pockets they
ucked,
'll make some nice marbles with this aque-
duct."

When the Seniors grew weary of locking their door,
And had given out contracts for cleaning the floor,
They turned their attention to Commencement night,
And then in their note books began to indite.
Singing, "It is now time our theses to construct,
We re all going to write on 'The New Aqueduct.'"

And poor 'eighty-seven, dyspeptic and meek,
Is bulldozed into working twelve hours in the week
In the chemical lab., with a filter and funnel,
A testing for ore in the aqueduct tunnel.
Moaning, "Prof. L. should let us by means of re-
duct-
ion test for rich ore in *that old aqueduct!*"

So the fever spread on, and one '88 man
Was found drawing in full a complete working plan
Of some modern design for a hydraulic ram,
To be used in some part of the new Quaker Dam.
Singing, "'89 thinks she don't want to be ducked,
She'd better not visit our new aqueduct."

Thus Graduate, President, Senior and Soph,
And Junior and Freshman, Instructor and Prof.,
All went wild over one and the very same thing ;
With th' exception, perhaps, of Professor MacString.
Singing, "How in the mischief can our Profs. in-
struct
If they're all taken up with that *blamed aqueduct?*"

But Professor MacCord, far renowned for his years,
In a most solemn voice expressed his grave fears
That—

[This will be continued in number 9 of volume
XVII, of the INDICATOR, price 20 cents.]

PRIZES: THEIR USES AND ABUSES.

For I have them on the list
As I am sure they won't be missed.

Prizes, like all else mundane, have their
abuses as well as their uses. If all things earthly
were classified into those useful and those use-
less, I would be inclined to class prizes, to-
gether with Jersey mosquitoes, among the lat-
ter. The custom of awarding prizes, though
an ancient and universal one, is sanctioned by
so many good and wise men, yet it is open
to many serious objections. There have been,
however, instances in which the offer of prizes
has brought good results. Prizes are now
offered for new and important discoveries in

science, and for excellencies in works of art and literature. Though the intentions are good and commendable, yet as the end can never justify the means, they should, in equity, never be used. The use of prizes may in some cases be more excusable than in others. For instance, in reference to works of art. But in no case are they justified, nor are they necessary. The best works of science and art have been done without their intervention. The greatest writers, scientists, and artists, are those who work through a love for their calling and not for other rewards; the only good that prizes can do is to call attention to the subject; but such men do not need this. The moment that they put a prize on their work, their object becomes mercenary and all its beauty is destroyed. The giving of prizes for the performance of good deeds is barbarous. Good should be done for its own sake.

A prize is in itself intrinsically wrong. When divested of everything but plain facts, it is nothing more nor less than a bribe given for something that should be done without its aid. It is simply a name for a very bad thing. Why not call it a bribe at once? for that is what it really is.

I remember that, at the institution to which I was sent in my more youthful school days, the discipline of the place, together with the learning of our lessons, was maintained by the fear of punishment on one hand, and by the bribery of prizes on the other. Then, in our youthful days, before reason and judgment had been fully developed, our minds needed something to force them into the path of rectitude, as, of course, small boys do not know what is good for them. On my part I enjoyed the companionship of both the rod and the prize, and I should, therefore, have no prejudice for the one more than the other. However, I look back with less satisfaction on the results obtained from the latter. I can remember distinctly all the ill feeling, jealousies, squabbles, and broils growing out of the awarding of prizes. A prize was often the destroyer of the warmest friendship.

After having grown out of the need of the rod, I had hoped never to meet again its boon companion the prize. But I was doomed to be disappointed. Here at the Institute, where young men who are old enough to see the earnest side of life, come to prepare themselves for their profession, there are given three prizes. Two of these are comparatively harmless, but the third is a doer of much evil. This enemy of humanity is the Priestly prize. Every Junior

class, but the present one in particular, suffered from its evil effects. In the process of obtaining it the object of the study of chemistry is lost sight of. Its victims become self-centered and forget the considerations that they owe to their classmates.

This year the study of chemistry has been made much harder, though the former generation found it hard enough. The work has almost doubled. Besides having to prepare the usual amount of qualitative analysis, the fortunate Juniors are required to prepare nine pages of the hardest kind in the chemistry, to review the former lessons each day to take down and copy in their note books, about nine or ten questions in the laboratory, besides the usual quantitative analysis, they are given salts to prepare. Together with all this misery, the prize comes in to make itself felt. The student is obliged to spend four instead of two afternoons a week in the laboratory, thus getting far from where they should be if they work faithfully during the required time. Our professor seems so absorbed in the competition that he forgets how much an ordinary student, working faithfully, should do. The consequence is, that already, some of the best students who are not working for the prize have been informed that they are behind, and have to exert themselves to get up to the mark.

It is a fact that may seem strange to the advocates of prizes, that in the department in which there are no prizes, the student works as well and even better, than in those in which there are. The money spent in prizes might be spent in a much better manner.

ELEMENTARY BLOW-PIPE ANALYSIS

I.

The subject of blow pipe analysis is one in which very little or no time can be devoted in the chemical laboratories of college. As it is not taught at all, there are generally but few prominent reactions to which any explanation is given. These reactions are very few, simple, and require but little time. Still there can be no true satisfaction in learning them, without also knowing something of the system to which they belong.

Blow pipe analysis has several practical advantages over the ordinary methods:

analysis, viz.: The necessary apparatus for qualitative analysis occupies but a small space and may be contained in an ordinary cigar box, thus being especially adapted for traveling; the determinations require far less time than if done by wet analysis; and finally, the amount of substance used is very small, when compared with the amount used in wet analysis. In many cases the latter can give no reaction unless much larger quantities are taken.

Blow pipe determinations are mainly applicable to mineral analysis, as in minerals the number of elements rarely exceeds four, exclusive of the water of crystallization, while the larger and far more important classes of minerals contain only from one to three elements.

A skilful operator is generally able to determine four elements in a mineral without difficulty, when any of these elements is not less than one per cent. of the substance, although with some elements the amount may be less, while in some others it must be more than one per cent. before they can be determined.

The subject is logically divided into three parts:

a. The reactions of the elements; in which a known substance is taken and the reaction observed. The object being to familiarize one's self with these reactions.

b. Qualitative analysis; in which an unknown substance, generally a mineral, is taken, treated in a systematic manner, and the occurring reactions observed. The object being to determine the elements of the substance by means of the observed reactions.

c. Quantitative analysis; in which a definite quantity of a substance containing the known element is taken and the amount of the latter found by weight. The object being to determine the percentage of the element in the substance. This division requires complicated apparatus, including a very delicate balance, and thus far includes only the elements, silver, gold, lead, bismuth, tin, nickel, cobalt and mercury.

The extent of the present article will only permit us to consider the reactions of the elements with any degree of thoroughness. A knowledge of elementary chemistry is presupposed, in order to understand the chemical reactions that take place, and which will be illustrated by formula whenever it is possible.

It is not surprising to see that groups of elements which are similar in their nature with regard to fluid reagents should also be similar when subjected to the action of heat,

either alone or in the presence of dry reagents. There are some exceptions to this rule; however, on the whole, we may say that group II. of qualitative analysis corresponds to the group which is determined by the incrustations on charcoal; groups III. and IV. correspond to the group determined by the color of borax beads, and groups V. and VI. correspond to the group which is detected by the color imparted to the Bunsen flame.

For practical reasons, this system is but the main portion of a larger system, which embraces also a few smaller groups and several special tests for certain elements.

As in wet analysis the elements are mainly determined in the form of certain invariable compounds having special properties, so also in dry analyses compounds principally oxides are formed, and the elements determined by the properties of these oxides. In a few cases the element is determined in its pure state or in form of other compounds.

The following order of groups is adopted in working through the reactions of the elements, being also the order in which a single unknown substance is treated when analyzed, the main object being to make the largest possible number of tests with the same portion of the substance:

Group I.—Elements determined by the *sublimation tube*.

Group II.—Elements determined by the *oxidation tube*.

Group III.—Elements determined by the *flame coloration*.

Group IV.—Elements determined by the *incrustation on charcoal*.

Group V.—Elements determined by the *colored borax beads*.

Group VI.—Elements determined by the *heating with soda*.

It may be stated that some elements belong to two or more groups, and that the special tests for certain elements will be given at the end of the group to which they properly belong.

The apparatus required are: A *blow pipe*, having platinum tip. This is the most important instrument, therefore close attention should be given that all the joints are tightly fitted, and the opening in the tip a perfect circle, .4 mm. to .5 mm. in diameter.

An adjustable *blow pipe lamp*, having a rectangular wick. Rape seed oil or a mixture of 6 volumes of alcohol and 1 volume spirits of turpentine produce a pure, luminous flame.

An ordinary *alcohol lamp*, *platinum* pointed *forceps*, *brass forceps*, a few pieces of *platinum wire* about 2 inches long, melted into the end of a short glass rod, the latter serving as a handle; a piece of *sheet platinum* about 1 inch by $\frac{1}{2}$ inch; some *glass tubes* 3 to $3\frac{1}{2}$ inches long, $\frac{1}{4}$ inch diameter, closed at one end; some glass tubes 8-9 inch long, $\frac{1}{4}$ inch diameter, open at both ends; a few pieces of fine grained *charcoal*, made from fir wood, being 4 to 5 inches long and from $\frac{3}{4}$ to 1 inch square at the ends.

The *reagents* are borax, phosphorus, salt, soda, saltpeter, hydrochloric and sulphuric acids, cobalt nitrate solution, water, litmus and fernambuc papers, and metallic tin.

O. Pr.

(To be continued.)

THE SUCCESSFUL COLLEGE PAPER.

To make a college paper a successful venture is not as easy a thing as it would seem at first, especially not in a college, where but very little time is devoted to literary work. Literary exercise, outside of a decided talent for writing, is largely a matter of training.

Children should be made to begin early in life to write their compositions, and follow these up by essays; so that they may be taught how to express themselves concisely and at the same time clearly.

The expenses of a college paper are very seldom paid by the subscriptions to it. This necessitates advertisements placed in the front or back of the sheet. To collect these, send in bills for them, and get the money all paid up, keep the books and see to the subscriptions, is in itself a very formidable work.

Then, for the matter contained in the paper, there ought to be a personal interest shown by every member of the college in the welfare of the college journal. Support should never be found wanting, no matter to whom one may turn.

Unfortunately this is rarely the case, and the editor of the paper has to spend a great deal of time going around soliciting articles to fill up his sheet. And although there are but few willing to write articles, there are always a large number ready to run down the paper for not containing enough material.

Besides collecting the material from the contributors, some one has to see that it is put in the printers' hands in time to get the paper out at the proper date.

Before the final copies are struck off, the proof sheets have to be thoroughly revised and corrected, and then, finally, the paper comes out and has to be distributed among the subscribers.

For all this the editor gets but little credit, and a great deal of blame. His pay consists in the appreciation of his work and encouragement, but how can he feel encouraged when students will not contribute or subscribe? To be a success, a college paper must have the support and interest of all the students in the college at least. The alumni can help a great deal. It is always interesting for the undergraduates to hear of those who have gone before them, and to see what positions they are filling. On the contrary, the alumni cannot help but take a deep interest in their alma mater.

A college paper containing alumni news is sure to be much more interesting to everybody, and it is sure to be taken by each right spirited alumnus.

WHAT IS AN M. E.?

Editor American Machinist:

Having long been an admirer of the *American Machinist*, on account of the excellent work it has been doing as an educator of American mechanics and mechanical engineers, it is with regret that I notice in an editorial, in its issue dated September 5, what I conceive to be an erroneous view concerning the meaning of the letters M. E. when placed after a man's name, and the right of any person to place them after his name. The editorial in question conveys the impression that these letters mean simply that the man is a mechanical engineer, or that he practices mechanical engineering for a living; that they are a descriptive title of the same kind as the words "machinist" and "boiler maker," and that they may rightly be used by any one who considers himself a mechanical engineer.

Will you allow me to enter a protest against this view, and to state my own opinion, which is: 1st. That the letters M. E. mean not that the man *is* a mechanical engineer by virtue of his having actually labored as such, but that he possesses a diploma conferring the degree of mechanical engineer, which diploma has been conferred upon him by a college having authority by law to confer such a degree. 2d. That no other person has any legal or moral right to use them. 3d. That while there may be no penalty attached by law to

the wrongful use of these letters, such as there is in many States to the wrongful use of the letters M. D. (which mean that the user of them is the possessor of a college diploma conferring the degree of doctor of medicine), the man who uses them and who is not the possessor of a legally conferred diploma which entitles him to use them, is guilty of a wilful deception of the public. It is possible that some who wrongfully use these letters are not guilty of wilful deception, since they are actually ignorant of their meaning, but they at least lay themselves open to the suspicion of wilful deception, and if honorable men they will no longer use them after they become aware that such use renders them liable to such suspicion.

That the letters M. E. do not mean that the user of them is entitled to any special eminence as a mechanical engineer, gained by years of labor or great achievement, is evidenced by the fact that not one of the eminent American engineers, whose long experience and high reputation entitle them to the front rank as mechanical engineers, now uses these letters, or ever has done so. The late A. L. Holley, who was pre-eminently a mechanical engineer, used C. E. after his name, but never M. E. John Ericsson, Horatio Allen, Charles T. Porter, Charles E. Emery, A. H. Emery, R. H. Thurston, Charles B. Richards, John E. Sweet, E. D. Leavitt, Jr., and many other eminent engineers who might be named, never used the letters M. E., not having had the college diploma legally entitling them to use them, and they would scorn to use them without such legal right. Some of these, however, use the C. E. or the Ph. D., to which they are rightfully entitled by diploma, although they do not now practice civil engineering or that class of scientific research for which the degree of Ph. D. is granted.

Still further, the letters M. E. are (with possible rare exceptions) rightly used at the present time only by the younger men in the profession of mechanical engineering, and their use actually advertises the fact, that their users are of comparatively limited practical experience, because they are young men. This results from the fact that it is but little over ten years since the degree of M. E. was first granted. The large majority of M. E.'s of the present time have not been graduated from college over five years.

The *American Machinist* has frequently had sneers at college graduates. I am not prepared to say that some of them are not de-

served. The fresh college graduate with the M. E. degree is apt to know very little of actual practice; but, as Prof. Thurston, over ten years ago said to a graduating class, the college course well fits them *to begin to learn to become* mechanical engineers. Many of such graduates I know, who, after receiving their diplomas, aware that the diplomas did not confer the advantages which only practice could give, went into apprenticeship in machine shops and iron works, working like laborers, at first on wages from fifty cents to a dollar a day. Who shall say that these men, after five years of actual practice, are not likely to be the equals as mechanical engineers of men of the same experience who have not had the advantage of a college training? Three such men I have in mind, who thus began at the bottom in 1876. They have been advanced by their own merits from one position to another, till they now have hundreds of men under their control. Two of them are superintendents of motive power of prominent railroads, and the other is superintendent of large steel works. Are there any mechanical engineers in the country who are not college graduates who have advanced so rapidly during the last ten years?

I have no objection, Messrs. Editors, to some of your correspondents continuing to sneer at college graduates. It will do the graduates good. They cannot have it too severely rubbed into them how ignorant they are of practice. It may teach them a proper humility which some of them are sadly in need of. But, say a good word for them occasionally in your editorial columns, and thereby acquire for yourselves a reputation for fairness. Laugh at them, if you will, for sporting the cabalistic letters M. E. These letters are only a little bit of plumage, which the new fledged bird is apt to be rather proud of, but, in the spirit of justice, at least, do try to discourage a certain class who are not eminent engineers, and never will be, from borrowing or stealing this plumage, and thereby making themselves contemptible. "Fine feathers don't make fine birds;" the M. E. don't make a mechanical engineer. The strutting peacock and the newly fledged M. E. may both be objects of ridicule, but the crow that steals the peacock's feathers, and the mechanical engineer who steals the M. E. that he has no right to, can only be objects of contempt.

WILLIAM KENT.

26 Highland Ave., Jersey City, N. J.

HOW FINE PORCELAIN WARE IS MADE.

The whiteness of porcelain is principally due to kaolin, which is a clay consisting almost entirely of pure hydrated silicate of aluminium. Other materials are combined with this to give the necessary toughness and cohesion; these, in the requisite proportions, are placed with a quantity of water in large vats, in which a thorough mechanical mixture is obtained by means of agitators. When the mixture in this fluid state, as white as milk, has been sufficiently stirred up, it is strained through sieves, varying in fineness from 20 to 30 threads to the inch. This liquid compound is reduced to the form of stiff dough by pressing out the superfluous moisture in strong cloth bags. In this condition it is ready for the potter. Before reaching him, however, it is weighed out into lumps by his assistant. The lump is first rolled into a pear shaped ball and then placed in the centre of the wheel or disk revolving horizontally. This disk is fixed on the end of a vertical shaft which is supported so as to have as little friction as possible. Another disk is fixed on the shaft about a foot from the floor, and it is by means of this that the apparatus is made to rotate. The potter sits with the apparatus directly in front of him, he places his feet on the lower disk and by pushing with one and pulling with the other foot, the apparatus is made to revolve with quite a high velocity.

The clay on the upper disk is made to perform the most extraordinary evolution. It spreads out, leaving a hollow centre, and grows like a mushroom under the skilful hand of the operator. As the clay revolves rapidly, the operator has only to change the position of his hands, which are dipped in water at frequent intervals, to produce any shape he may wish.

The exquisitely thin cups, etc., from Sevres are, however, made in an entirely different way, *i. e.*, by means of plaster of paris moulds. The moulds for cups are made like a cup with sides about $\frac{3}{4}$ of an inch thick, the interior of which corresponds exactly to the exterior of the cup to be made. Into this mould is poured an aqueous solution of the clay, which is about the consistency of thick cream. This solution is allowed to stand in the mould a length of time proportioned to the desired thickness of the cup.

After the mould has stood the required time the solution is poured out and the mould set

aside to dry. As soon as the liquid is poured into the mould its pores are freed of moisture from the liquid, and the clay is deposited in a thin film all over the surface of the thickness of which keeps increasing as the solution is poured out. As this film gradually contracts, so that when it can be easily turned out of the mould.

The articles, after leaving the hands of the potter, are placed in the drying house. When sufficiently dried they are placed in "cruit" kilns, as they are oddly called. The porcelain ware is baked twice, once in the drying kiln and once in glaze. Some of the finished ware are submitted three times to the fire of the kilns. The process of baking continues from 35 to 50 hours.

To the INDICATOR:

The above is described from what was actually seen at Sevres, by

C. H. P.

THE SONG OF RANKIN

AIR—*Villikins and his Dinah*

Come all ye close students and listen
I will sing of a man and a bold enginee
Who wrote large red volumes of many
And went by the memorable name of RANKIN.

CHORUS.

Singing fulcrum and lever, corner joints,
Resultant of motion with the different points.

His text book of mill work was worst of all
Containing hard chapters, good drill for all
On cog wheels and cycloids he talked at length
But what struck us most was his skew ball.

Singing, fulcrum, etc.

On side valves and pistons he had a quibble
As well as a chapter in parallel motion
And he'd muddle you so with a demon
That you'd wish yourself at the end of a ribbon.

Singing, fulcrum, etc.

He wrote a big volume which is labelled
On the transfer of motion, with a glance
And the vehicle motion, with its normal
Either crazes or blinds you—it is hard to learn.

Singing, fulcrum, etc.

His book for the civils, a solid old thing
The way he made figures was a shame
With stringers and trusses, and their reactions
And arches and piers, with their solid frames.

Singing, fulcrum, etc.

The last thing ever written by Mr. Rankin
Was a book on engines to be driven by steam
With a crank and crank arm which was the
neuvre,

And steady old piston he called the principle
Singing, fulcrum, etc.

Mr. Rankine is dead, and we'll see him no more,
But his name is engraved on the engineer's door;
So we'll put him away in an old shady nook,
And set for a tombstone a red covered book.

CHORUS.

Singing, fulcrum and lever, connections and
join'ts,
Resultant of motion with the dead working
points.

—Exchange.

SCRAPS FROM OLDEN TIMES; OR, THE
STUDENT'S LUNCH.

HE morning sun shinned up the eastern slope and cast a prize refulgence on the "Land of the Free and the Home of the Dutch." And as the sunbeams glimmered with a nickel plated glimmer and sneaked noisily into the eyes of the Dutch, the Dutch rose up with one accord and girded on their second hand clothing. With one accord, they said "Wie Gehts," and sallied forth to brew the vulgar beer and drink thereof. And with the Dutch rose Dutch Lewwie, Iceberg, the keeper of the "beanery." "I see," quoth he, "the sunbeams prowling in. 'Tis time to agitate a limb, and mix the sawdust with the bread and dust the ancient buns and pies that I've had on hand for over oofteen months. It's hard lines to run this baker business. Got to reduce running expenses sure. I'm only making four hundred per cent. on buns and I ought to make five. Now, 'by my troth,' pulverized sugar is too luxurious for this concern. Crushed lime is just the thing to use. I must be up and order some; one, two or three, four or five, six or seven, eight or nine barrels, and what I don't order, by heavings I will steal, with my hand cart and my little son, when the midnight shades cavort and wilt the carrots in yon grocer shop."

And as he spake he gaped. Not an ordinary Dutch gape, gentle reader, but a Lewwie Iceberg gape. A gape which goes around begging for description. But Lewwie was very considerate about it though, and roofed it over with a wash bowl. He let the board of

health have their own way about it. They told him several times that they wasn't going to have him circulating his breath all over the country, and then have the people promenade all over their shapes for bad sanitary conditions. No, sir! The board said they were altogether too fat and lazy for anything of that kind.

"Yes, yes, yes," continued Lewwie, as he gave a hop, skip, and a jump into his undershirt, and adjusted the rest of his rags. "Lime is quite the proper article for sugar. Sprinkle molasses water over it for taste. Taste don't amount to much. Bulk for one cent is the great unvarnished end. Ho, ho! I am a snoozer, though. Great and deep is my expansive intellect, and great and deep is the gouge I make in the students. Ho, ho! He, he! Ha, ha!" and right merrily his spirits cantered on the up grade, and very shortly he spread out in a little thing of his own. Just listen.

Oh, I'm the chump that keeps the place,
And I'm the cook as well.
My wife she tends the "beanery shop,"
And the ancient food doth sell.

[Double stitch step to the right and then "bango" on the floor with his heavy pedal, continues.]

My pies and cakes and penny buns
I never have to bake,
But from the other bakeries
Their antique stock I take.

For them I scarcely "noddings" pays,
Yet, he! ha! ho! *Pard!*
I gouge the Stevens' students,
And full price I make them pay.

[Repeats the former step, running Boom la, with both pedals.]

Then give three cheers for Iceberg Lew,
Of flies he is bereft.
For damp and chilly is the day
When Lewwie doth get left.

[Pebble goat tread, in four different directions, and double choum—m—m—m in the air.]

But Lewwie got a little bit too fly on the last choum—m, and he accordingly fell down two pair of stairs with a genuine Dutch thud. After having performed this great gravity act, he picked himself up and began to quote choice selections from favorite authors, Lewwie Iceberg being the prime favorite.

"Now, darn them stairs," he began, as he untangled more than half the household furniture from his neck. "I shall have them removed. Yes, sir! That's the *n*th time I've

fallen down 'em this week. Yarkup! Yarkup! *Alles* and gnaw the front stairs into kindling wood. Acquire a very weighty motion, or I shall fall down 'em again."

And Yarkup moved heavily with his front teeth, and Lewwie promenaded up and opened the "beanery" for the day. And then his wife appeared, to engineer the "snyde" store, while Lewwie went below. She took her place behind the counter and gnawed on bologna and the low born onion, while the cockroaches held a dress parade on the show case. The time was 6 a. m., and Lewwie rushed about below to make people outside believe he was baking something fresh, but of course he wasn't rash enough to do a thing of that kind. He had eight baking pans down there; and first off he'd put 'em on a shelf, and then all of a sudden he'd knock 'em off, and then you'd hear more noise than all the steam bakeries in New York put together. Then, whenever a customer came in, he'd shove all the pans off twice and rush upstairs and lug big baskets of stale rolls out to a cart in front of the store, just as fast as his two legs would let him. Then, as fast as he put 'em in the wagon, his little son came up the cellar way and took 'em back down stairs, so as to have another basket for his pop to take out. They'd keep this up as long as there were any customers in the store, and then when there were two or three customers, all his wife's Dutch relations would pile into the store and leave big orders for bread and all kinds of truck. Every other day the whole family would take down all the stock and soak it up and pummel it, just to keep it capable of being masticated by anything this side of a goat. That is, anything with a liberal jaw this side of a goat. False teeth and gums wouldn't work for a cent, unless the article was soaked all night, and then the individual might be led into the belief that he was eating a dish rag or stale flour paste. Lewwie had any quantity of "skin games," but lack of space prevents an enumeration of them all. A few specimens will do, just to show how he could bulldoze the public with eight baking pans, a big Dutch family and excessively ancient victuals of all descriptions.

The morning wore on, and so did Lewwie's pants, sitting around and waiting for noon, for then was the time that the great jingling of shekels took place, as at that hour the blithe hearted and thoughtless students wandered over for the noonday meal, and got stuck the worst way by Lewwie.

Well, as was previously mentioned, the morning and Lewwie's pants sang softly the duet, "Wear on, oh double jointed morning," and in reply, the double jointed morning kept wearing right steadily on until it run out of "wear" entirely, and had to stop short. Then was noon at hand, and up rose Lewwie and smote his hands anon; and in piled the whole family to tend the "beanery," at the hour of jingling shekels.

In something that approximated to a few minutes, the first detachment came. The same old dingy mob in the same place. Every detachment had always just the same number and just the same place to stand, and masticate baked lumber. First came old Korpzingaboom the Lean, with the flowing shape that bulged in seven consecutive directions without making any deliberated attempts to bulge anywhere in particular. And then in contrast came Sir Bung, with a shape that did not pretend in the least to do anything but bulge. Then followed Peed, the Microscopic Mackerel, Skein, St. Luke, and many more. With the same movement they simultaneously cast their eagle eyes on the proper article of distress and dyspepsia and fell upon it, also simultaneously. After the first round the amount eaten began to vary in direct proportion to the strength of the eater. And the amount eaten at the end of any one second was equal to the strength, into the size of the mouth, specific gravity of the article and number of the second. In this connection it is well to mention that in finding the specific gravity in this case, bricks are taken as unity. In a few minutes the company began to converse on various topics highly instructive and entertaining.

"I say," said Koopzing, as he picked up an imitation doughnut, "what's this doughnut made of? It's the best I've had this season. Try one, fellus. I've eaten eight."

Lewwie heard the question, and told Koopzing that it was made out of a superior kind of butter and sugar, and then he laughed clear way up his sleeve and down his back because he knew all the time that it was made out of whale oil and smoked herring (old).

"Got any apple pies?" continued Koopzing

"Yes," said Lewwie, and he brought forth an old pin cushion in disguise, "fine; baked to-day." And Koopzing ate thereof and thought it rich in flavor.

"Now, I wot," spoke up St. Luke, "but this is something rare. No flies on this, grasping a cream cake that had begun to re

a corn fritter from age. St. Luke e indeed. No flies there were on that, glorious old reason that the flies could : on it ; too rank for 'em.

w, I think truly," he proceeded, "that I e a few of these home in my hat. I'm nd of these ;" and he took four more osided into masticating silence.

ur taste is very good, St. Luke," an-Mackerel, "but mine is undoubtedly in G. These are the things to grow n," and, taking a charlotte made out of d plaster paris and asbestos, he began id to business.

n't either of you know what is good,"

Bung. "This is the thing that is su-to everything else," and he tackled ously a ham sandwich stuffed with lard, errily did a little stream of it trickle

adown the front of his breeches.

te in silence for a few moments, when

ly Peed dropped his cream cake all over

y shirt front of Koopzing, and with one

they all dropped the objects of their

efforts, for afar off had they simulta-

spied the "beanery" belle, and, as

ood in rapturous silence watching the

ching maid, the festive Lewwie stole

isly around the backs of their chairs

thered in the dropped victuals, and he

them on the counter and sold them

gain. You see, that was one of Lewwie's

ames. The maid was one of his Dutch

is, and she used to assist Lewwie every

the great second hand racket. In this

e boys used to buy the same article over

several times. They always forgot

dropping the things, and came to the

sion that they must have chewed it up

, so they usually dealt out the ducats in

it for another supply. Shortly after

second detachment came in, contain-

large percentage of "preps.," with va-

inds of shapes, all of them inferior to

an early potato.

w, look at that," said St. Luke, point-

big, fat and lazy prep., old enough to

ried ; "do you 'spoze that would float

ould fall in the river?"

er," answered Koopzing ; "scap fat al-

oats." And then the prep. took sick,

ldn't eat his rubbish.

ay," spoke up Peed, "these preps. draw

id bugs. Look at the size of 'em. I

's move off and let the vulgar prep. pur-

way alone."

say we all of us," rejoined the mob ;

and straightway they lit out and got them-selves hence. The preps. ate on and on until they, too, were filled with past ages, and heavily they dragged their gigantic feet behind their diminutive bodies and left Dutch Lewwie to himself. He gathered up his shekels in a pile and counted up his goodly stock. Then laid he them away in a stocking that he stole the week before from his neighbor's clothes line.

"Now, on, on with to-morrow," he ejaculated, and, with a laugh that shook all the mortar out of the wall, he sang in a swan's down manner :

Then give three cheers for Iceberg Lew.,

Of flies he is bereft,

For damp and chilly is the day

When Lewwie doth get left.

(Rubbi dub, de, de, de ! with both heels in the show case.)

T. DINGUS KEHOE.

COMMUNICATION.

"OH, YE TEES!"

To the Editors of the Indicator :

If all the students take the INDICATOR, as they should, this notice will come under the eyes of all. It is in regard to the way in which T squares belonging to some of us are handled by the members of the other classes. There are very few members of the Institute, I think, who would be unwilling to allow members of the other classes to use their squares, if they would use them properly. But, when students persist in taking other people's squares and having fencing matches with them, or bat their neighbor over the head with them, or use them to drive in tacks with, naturally the owner of the mutilated square feels rather badly about it. As long as this continues, there is no use in buying new squares to be broken up by those students who never have gotten one of their own, but persist in using, or rather misusing, those belonging to some one else. Our professors have taken every precaution they can to protect our property, but they cannot watch over each student's individual property. It rests entirely with the students, who should, as gentlemen, have regard for the property of others. Hoping that this may assist us all in keeping our T squares in good condition,

Yours, for fairness,

T. S.

The Stevens Indicator.

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WE publish from the *American Machinist* a communication from Mr. Kent, '76, regarding the meaning of the title M. E. In an editorial, which claims to call attention to this letter, we notice the following sarcastic remark: "There is one item of information in this communication covering a point upon which we are glad to be informed; that is, that the letters M. E. may be rightly used only by those with little or no practice in actual mechanical engineering. We do not believe it is generally so understood, but if it comes to be the practice, it may be just as well." We gladly acknowledge that this anathema against "technical schools" in particular, and all graduates in general, is in entire sympathy with the sentiments of most of the *Machinist's* subscribers, though not accepted by its learned contributors. Nevertheless, we beg to remind the editors of that paper that in ancient times, before men were licensed M. D. at an institution of learning, there were many persons, without a collegiate education, who had acquired sufficient experience and knowledge, by personal observation, to accomplish, at times, extraordinary cures; but still, at the

present time nobody questions the exclusive right of medical graduates, however young and inexperienced they may be, to the so called degree of doctor of medicine.

Give the young M. E. a chance to obtain a good footing in the "profession," and you shall soon see whether or not he will be able, by dint of a superior theoretical training, to compete successfully with the old and "practised" men, who are obliged to take things for granted on authority, without individual investigation. As the science of mechanical engineering is gradually being reduced to a collection of strict mathematical truths and laws, so the necessity for a thorough theoretical training shall be felt more strongly as years roll by. When the now sneered-at college graduate shall have the recognition he properly deserves, when one sided practical men shall have been mercilessly swallowed by their all consuming *idée fixe* of perpetual motion, and when science, in her entire majesty, shall rule this sphere, then shall practice bow implicitly to the mandates of theory, and the proud executor of reason's commands shall acknowledge the superiority of the humiliated legislator.

MR. PFORDTE, formerly a member of the class of '85, has returned to finish his course at Stevens with '86. He has studied blow pipe analysis under Prof. Richter, of Freiberg, Saxony, and has kindly volunteered to contribute a series of articles on that interesting subject. As he is especially conversant with this branch of chemical determination, we have no doubt but that his concise and elementary treatment of that study will prove a source of benefit and information to all of us.

THE frontispiece of this number of the INDICATOR is by Mr. Kolb, '88. As an artist, our æsthetic Sophomore promises a great future. Entirely devoid of the crudeness usual with first attempts in sketching, the "Leaf from the Sketch Book" makes us anxious to see another from the same hand.

INDICATOR CARDS.

The other day we entered the building with an intention of taking a card of the library. We found everything in splendid order. At the librarian's desk was an alphabetically arranged catalogue of subjects, as well as one of authors. The books had been classified and re-arranged; the book cases were numbered, and attached to every case was an index showing every book belonging to the class for which that case had been reserved. Any book whatsoever could be obtained from the librarian within a surprisingly short time, and the key of any case was lent to any student on application. The study room especially, was as quiet and secluded as ever, no loud talking being permitted. A writing table also, was noticed, with a pair of large scissors hanging at its side (evidently reserved for the editors of the INDICATOR).

Our indicator was evidently drawing on its over-fertile imagination, and had built a "card in the air;" probably it was taking a glance into futurity. Still another explanation would be, that we had examined the card upside down, and that it was all vacuum and no pressure. Take your choice.

A card was taken this month of the literature course. In this department it should be noted, the "Shaw" packing was formerly used entirely. This, however, was of such loose material, that a large amount of steam was wasted by escaping through the stuffing box. Part of this packing has now been replaced by a substance known as "Chaucer," and the card taken shows a much more satisfactory condition of things. The stuffing box, however, is not yet what it should be. We would suggest that a large quantity of the "Shaw" packing be removed, and that the remainder be worked up with more substances of the same nature, as "Chaucer," such as "Milton," and "Shakespeare." Such a change, we are sure, would be for the better, and all the steam generated would be utilized. As it has been, a great amount of the steam generated has been wasted on the desert air.

Prof. D. V. Wood is taxing the powers of our Juniors and Seniors to a surprising degree by making them solve a great many real and imaginary problems of mechan-

ical appliances, as well as of proportioning of parts according to mathematical principles. Apart from that, short essays on different parts of the steam engine are written or compiled by the students, and read almost daily before the class. The only drawback seems to be that the class at large do not, and perhaps often cannot, follow the thread of the article with the close attention it may require; still, it is beyond the shadow of a doubt that the student who writes such a short thesis profits greatly by being obliged to hunt through numerous books, and to read many opinions, before he can give even the most superficial view of his subject.



The athletic grounds have received their due proportion of attention the last month; the team practising as usual every afternoon from five to six. During the early part of the month, it was customary to see but one whole director on the field at one time, but lately we notice with satisfaction that the occasions are rare, when a quorum of the board is not present.

The board is in good working order, they meet *occasionally* every day, the corresponding secretary has bought a "Complete Letter Writer" with an appendix on "Bulldozing as a Science"—so all goes well. We hope to see the games with the University of Pennsylvania, Wesleyan and Rutgers arranged definitely, after which the team will probably go into quarters.

FOOT BALL.

The team in the games played thus far have earned the reputation both of good players and, to our sorrow (at Easton), of developing some characteristics which would make an honest player blush.

The first Princeton game, on our grounds, was a disappointment to many, after witnessing the Yale game. To be sure, Princeton has a first class eleven, but still that does not explain why all the hard work was left to Cotiart and Cook. These two, of the whole team,

were the only players who tackled surely. The half backs were wild, wild! Gilchrist made plays that showed plainly the need of a perusal of an elementary treatise on foot ball. At one time we had the ball within a few feet of Princeton's goal line, yet, without an effort, this chance was lost, and touch downs for Princeton continued with a regularity and rapidity that made good people pray for darkness or rain.

The following Saturday, the eleven, although crippled, went to Princeton, to play the return game. Rash people in Hoboken staked money as a guarantee for the assertion that the score would be up in the hundreds. The game was an agreeable disappointment to every one, and a decrease of twenty-two points on Princeton's former score was very cheering.

With such a showing, the game at Easton was looked forward to with much interest; but it was an off day (or something similar), and we lost. The record of the eleven was reported as follows: So and so played poorly; so and so, very poor. This one walked up and down, as though on dress parade; another forgot he was on the field; and *but one* out of the *eleven* amounted to anything, and with such poor support he was unable to make headway against Lafayette's eleven.

The game between Columbia Law School (so called, for why we can't say) and our team was a very pretty game and well contested. The Columbia eleven was made up of old players from Princeton, Yale, Harvard and Columbia, and naturally were well acquainted with the game. A serious fumble, followed by a splendid run of Hodge, gave Columbia a touch down. This was the only point scored during the game. The appearance of three new men on our team, and the manner in which they played, deserve special comment. Captain Hart *per* the Board of Directors, is (or are) to be congratulated in his (or their) choice.

Campbell, to be sure, occupied his old position of half back, and proved his former reputation of a strong and brilliant player. Crisfield, as end rush, played a faultless game, and elicited much enthusiasm. His manner of tackling excelled any on the field. Randolph was capital and worked effectively.

Captain Hart resumed his old position, but the remainder of the centre was weak. Considering the amount of weight there is next to him, very little of it is put to good use.

The class games have not been played, but

'89 has been busy, and handsomely defeated C. C. N. Y., '89, by a score of 55 to 0, and the High School have won two or three games from neighboring schools. The game, '88 *vs.* '89, was an occasion of considerable importance, and proved most exciting, finally ending in a draw, the score being 4 to 4. The adherents of both teams displayed their loyalty in the usual way. The referee, although an honorable gentleman and known to have great presence of mind in times of public disturbances, entirely lost his usual admirable control over himself, and drew forth volumes of applause for the faultless game he played as a rusher for '89. His placing of the freshmen was admirable, and the only evil result noticeable was a great many chances lost to '88. Then once he forgot entirely that he was referee, and began a disconnected tirade on some one in the distance, but coming to, he, like a good referee, played an '89 man opposite '88's centre rush and nobly saved a touch-down for the freshmen. The game "wound up in a row."

Princeton.

On October 14th Princeton played on the Stevens grounds, and, as was expected, gained an easy victory. There are no comments to make; the game was too one sided to be of interest, save in the fact that the Institute eleven was gaining additional experience, but it was too well paid for, as the total score was 94 points to 0, in Princeton's favor.

The return game was played the following Saturday, Oct. 17, and was a better game. Princeton's referee was up to the standard, but displayed a surprising ignorance of the rules, occasionally, whenever an opportunity offered, to aid the home team.

In the first half, Princeton scored 38 points, Stevens 0. The excellent passing of the Princeton men, and brilliant playing by De Camp, Lamar, Cowan, Irvine and Haines, yielded them 34 points in the second half—the score standing 72 points to 0, in Princeton's favor.

Stevens' rush line was fair. Cook and Cotiart played the strongest game; White and Gilchrist, also, did well.

Lafayette.

Saturday, Oct. 31, the Institute eleven went to Easton and played a very loose game, which cost them a victory. Game was called at 3 p. m., Stevens' playing up hill, with sun

aces. A series of fumbles gave Lafayette touch down in ten minutes. This desired effect on our men, and, working well, the ball was forced within a yard of Lafayette's goal, when T. Hart made a fair catch. A placed kick for goal had been made, but through bad play this opportunity was lost. The play was repeated shortly after this, and a chance for a goal was lost. Lafayette had another touchdown, when time was up, Lafayette, 10; Stevens, 0. In the second half, Stevens scored three touchdowns in succession, two by Cotiart, one by Ryan, but no goals resulted. Play continued when a Lafayette man started with the ball, caught and "held" by our men, still down the field, making a touchdown, as the referee allowed. A goal resulted, and was called, with Lafayette winners by a score of 16 to 12.

New York (graduates).

Stevens met the Institute eleven on the grounds, Oct. 31. As originally organized, the New York team consisted entirely of players from the leading colleges, but, as they appeared for the game, they had recruited players from outside sources until the eleven was complete. Bird, captain of Princeton's team; Hodge, captain Princeton lacrosse team, and several well known Yale men were on the eleven a particularly strong one. The game proved exciting, and was very contested. Hodge, by a beautiful run, made a touchdown for New York. This was the only point scored, and when time was up, Stevens was disconsolate. New York, Stevens, 0. We ought to play these fellows in, and do better!

Inter Collegiate.

Stevens vs. Wesleyan.....	16—0
" "	68—0
" Mass. Inst. Tech.	51—0
Princeton vs. Pennsylvania	72—10
" " "	80—10
" " Johns Hopkins.....	108—0
Pennsylvania vs. Haverford....	68—10
" " Lehigh.....	58—0
" " Lafayette	30—22
" " "	54—10
Wesleyan vs. Trinity.....	60—0
Lafayette vs. Lehigh; given to former.	
"Wound up in a row."	

PERSONALS.

'75.

JAMES E. DENTON will lecture, in February, before the Franklin Institute, Philadelphia, on the subject of "Some Practical Examples of the Laws of the Conservation of Energy."

FRANK M. LEAVITT is proposed for membership in the American Society of Civil Engineers.

'76.

JAMES M. CREMER, Assistant Superintendent of the Cummer Engine Works, Cleveland, is proposed as a member of the Mechanical Engineers' Society.

WILLIAM KENT is Secretary and General Manager of the U. S. Torsion Balance and Scale Co., 92 Reade Street, New York.

'77.

JOHN RAPELJE is General Road Master of the Denver, South Park & Pacific R.R., with headquarters at Denver, Col.

'78.

BROWN AYRES is Professor of Physics and Astronomy in the new Tulane University, of Louisiana.

E. P. THOMPSON is Associate Editor of the *Electrical World*, New York.

'79.

R. M. de AROZARENA is proposed for membership in the American Society of Mechanical Engineers.

'80.

GEORGE M. BOND reads a paper on "Standards for Pipe Threads," at the Boston meeting of the American Society of Mechanical Engineers.

WILBUR V. BROWN was appointed last June, Assistant Professor of Mathematics in De Pauw University, Greencastle, Ind. He also acts as Director of the Neckim observatory, connected with that institution.

Dr. B. F. THOMAS, in June, received the appointment of Professor of Physics, in the Ohio State University, at Columbus, to succeed Prof. T. C. Mendenhall.

'83.

MALCOM McNAUGHTON is with the Torsion Balance and Scale Co., New York.

JOSEPH E. STEWARD is inspecting bridge material for the P. C. & St. L. R.R., at the Central Bridge Works, Buffalo, N. Y.

L. S. RANDOLPH read a paper on the "Strength of Stay Bolts," before the Ann Arbor meeting of the American Association for the Advancement of Science, in which he records some experiments made to determine the strength of socket bolts, as used in the sides of fire boxes on locomotive boilers.

'84.

JOHN A. BENSIL was recently elected Junior Member in the American Society of Civil Engineers.

E. L. DENT is proposed for membership in the American Society of Mechanical Engineers.

'85.

H. D. WILLIAMS is nominated for Junior membership in the American Society of Mechanical Engineers.



Brace up, Glee Club !

Have you seen the INDICATOR gymnasium ?

"Hee-or ! hee-or ! come down from the or !"

Will quicksilver down a fellow's back poison him ?

'89 is already noted for its poker playing propensities.

An ideal chaplain for the Senior class, M-t-lf in a plug hat.

Various styles of "iron clad" books are now in vogue.

Thanks to Prof. MacCord, the INDICATOR has "come home again."

And now the Junior breaketh his struggling for the BEASTLY prize.

Who is it that says knickerbockers shortly be worn again at Stevens ?

LUTHIN (to Soph.)—Have a Chat
SOPH.—Tin Tag or Gold Coin ?

There is a lock on the door of the more cloak room. How long will it

The freshmen have quit using the room as a lunch room since the detective came into play.

PROF.—What is a vacuum ?

STUDENT.—A vacuum is anything in it.

Patronize the "Beanery ;" all attractions. For further particulars see some of the '88 men.

It must not be imagined that the Junior is mentally weaker he is weaker than a Senior.

CLASS II. and III. are precipitated by IV. and V. by alkalies, but the Junior is precipitated by Roscoe.

PROF. (dictating)—Question X various descriptions of alums—er—Ah, there !—Stay there.

JUNIORS : Prepare to see the contest, not between John L. and Slad, but between John L. and Julius.

Chemistry—

"Now, gentlemen, he has numbered the following question 46 B₇."

The freshman "hit the nail on the head" several times during the first few hours of his vice work course in the shop.

'88 has clearly demonstrated that it is what harder to restore ceilings to their original color than to "paint them black."

The depth of meanness is reached when a freshman sticks a thumb tack right in the centre of a higher class-man's desk.

PROF.—Do you know of an engine without a connecting rod of infinite length ?

STUDENT—Yes, sir ; one that has

According to a Soph., we read of "Steam Machines" that "in 1840 Jacobus Perkins propelled a boat by means of electricity upon the

TO A FRESHMAN.—Yes; we agree with Daniel Webster that a man has two characters. To be or seem to be, that is the question.

The Juniors have revived their taste for literature and have taken kindly to Pope. The "Rape of the Lock" seems to be the favorite.

It takes a pretty girl just fifteen minutes to don her hat. We doubt if the freshman, with the carefully adjusted bang, can lower the record much.

Suggested to '88.
Here's to '89,
For she's much in need of brine.
Drink her down, etc.—*Ex.*

We know of an '87 man who comes under the following description: "Ful longe wern his legges, and ful lene, Y-like a staf, there was no calf y-sene."

(EXTRAORDINARY DEFICIENCY.)—Prof.—Do you know the answer to that question?

STUDENT.—I don't know that I do, and I don't know that I don't.

Delinquents beware! Those who do not pay up their subscriptions within a reasonable time will receive a visit from the business manager and his detective camera.

The following will apply to nine out of every ten men in the college:

"Nowher so besy a man as he ther was,
And yit he seemede besier than he was."

The Senior decks his room with sayings wise,
And works of art pour from his skilful hand;
Here coming men will gaze with wondering eyes
At these, their gorgeous footprints in the sand.

A Freshman must be pretty much exasperated to have courage enough to rush into a sophomore mathematical recitation and clamor wildly for his hat which he had left in the room.

FRESHMAN (watching foot ball game)—Which are the further back, the half backs or the full backs?

SOPH. (contemptuously)—The quarter backs, of course.

The neutrals called a meeting on October 28, to elect their representatives on the college annals for the coming year. J. R. Slack was chosen for the "Eccentric" and Robert G. Smith for the "Bolt."

Most of the Juniors are busy drawing a tombstone and its perspective. Are they afraid that their overwork will tell on them or are they in love, that they are for once so much concerned for the future?

Prof. Leeds brought down the house the other day when he ignited $H_2 + Q$. The bung went one way and the cylinder the other. No one was hurt, although a few sophs. in the *bald-headed row* were drenched.

The student, whose message to a senior working in the physical laboratory, was a mere nod of the head, very easily got ahead of the professor, notwithstanding the fact that "the rules are very strict in regard to this matter, sir."

Now, subscribers are the first ones to read the INDICATOR when it comes out, by looking over their subscribing neighbor's shoulders. Are they the same ones that pass their examinations by reading over these same neighbor's shoulders?

PROF.—If you were going to build a blast furnace, by what circumstances would you be governed?

JUNIOR.—"I'd look for a place where the water was good." Class laughs, and wonders why he didn't say beer.

PROF. OF MATH.—"Your text book tells you how to get at the distance of an object, but it makes use of the optical law regarding conjugate foci. That is unnecessary. I shall now proceed to show you how to see this thing without *optics*." And the class did.

The following are the officers elected by '8 for the ensuing year:

President.....R. N. Bayles.
Vice President.....M. C. Beard.
Sec. and Treas. Jos. A. McElroy.
Hist. R. M. Anderson.

You must not suppose, because you hear no more grumbling about literature or descriptive, that the Grumbling Sophomore is extinct. He has merely changed his tune, and sings a full contralto to the wild tenor obligato of the Juniors, in a love song addressed to chemistry.

While it is true that the black and yellow stockings of the Princeton men made them look somewhat like a set of potato bugs, it does not follow that our men should not have some uniformity in color, instead of some wearing red, some blue, and others black.

The glee club will get under way just as soon as the "board of directors" can examine the lungs of the applicants. In the meantime we would advise each student to go down to the grounds every afternoon and yell for all he is worth. The board will be there to pick out the best men.

Two little Preps., in short pants, were overheard yesterday in a discussion on the relative advantages of walking and running to develop their legs for kicking in foot ball. Just imagine what abnormally muscular men we will have on our eleven in future years, if Prepdom commence thus early in life a "scientific training!"

Soph., laboriously endeavoring to establish electric communication between two wires on the basement ceiling, in the hope of ringing the regulator bells, "Say, Louie, what wires are these?"

Louie—"They were used last in a dynamo test two years ago."

Soph. comes off his perch to remove the plaster from his hair.

Professor of Chemistry (reading):

"Question thirty-nine and a half. What are acids, oxy-acids and salts?"

Student interrupting—"Professor, does the 'oxy' refer to salts?"

Professor is completely paralyzed; a burst of laughter from class, followed by silence for the space of five minutes, during which professor endeavors to find where he left off reading, and class nervously sharpen pencils, preparatory to taking down question "thirty-nine and three quarters."

At the meeting of '86 the following officers were elected:

President.....	C. R. Collins.
Vice President.....	Emile Cotiart.
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It was decided to levy a monthly tax of \$1.50 on every member of the class. All the necessary committees have been appointed, and the work will be started as soon as possible. The class of '86 is bound not to be outdone by any of its predecessors, nor by any that may come after it.

BOARDING HOUSE NO.

— Hot lunches will continue to be cold.

— It is rumored that some of the students have had turkey.

— Corn beef and cabbage hold quite strongly in some houses.

— A very delicate soup is made in the shadow of a chicken for one.

— Some of the Freshmen say they will see Charlie Ross every Sunday for dinner.

— A number of houses are sending feather beds back to the foundry to be repaired.

— Hash will be plentiful for so long as the game law is off and cats are plentiful.

ENGINEERING ROOM

In round numbers, a modern high speed locomotive with 18"x24" cylinders at 150 lb steam pressure, when drawing a train of 100 cars at the average rate of 50 miles per hour, exerts 733 horse power.—*Mech. Eng.*

A second hand dealer was trying to sell a boiler which had a badly bagged end. "I say," said the customer, pointing to the end, "how is that? That don't appear right, does it?" "My friend," said the dealer confidentially, "they make 'em that way nowadays. Didn't you know? The inverted arch was one of the strongest forms of construction ever introduced into boiler making."—*Locomotive.*

Two hundred and eighty thousand pounds of dynamite and rack a rock—a large quantity of explosive—were successfully exploded at Rock, near this city, on the 10th inst. The large quantity excited some apprehension in the public mind, as it was unprecedented that no damage was done, and the explosion was unnoticed a short distance away. The fact was stated that so far as danger was concerned, the vessels might have gone within a few yards of it. The above includes the cost of the dynamite in the case, but the daily papers paid a penny a lined it out to four pence.—*Engineer.*

Exchanges

Where is the *Eighty-Four*?

Albion college has a cornet band of four-hundred pieces. It has also one of the largest college orchestras in the United States; at present there are forty pieces.—*Pleiad*.

A Syracuse Union Freshman, when asked by a society man recently, if he had pledged, replied: "I believe I did say something to you about not going into a saloon, but if you could get a bottle in some retired spot, I don't think I would object."

The *Univ. Herald*, from which we clip the above, must have a large reportorial staff. It manages to fill up four columns with personal notes, six with local notes, and half a column with marriages and deaths.

We learn from the *Purdue* that the new shops for the Mechanical and Engineering departments are completed, and that Purdue University has the finest equipped Mechanical School in the West. We wish Purdue success.

The *Lehigh Burr* has an editorial on the absence of proper garments for gymnasium work. We invite the *Burr* to inspect our gymnasium suits. Sophomores on exhibition on Monday and Tuesday, Freshmen on Wednesday and Thursday, from 2 to 5.

We don't want to poke fun at the *Chronicle* continually on account of its gaudy cover, and its friend *Chronicle*, why don't you place a little something like your prospectus on the cover? It would be much neater. By the way, we are sorry that you have lost Prof. Adams. We can sympathize with you, as Cornell has taken one of our professors also—Prof. R. H. Thurston.

The success of the *Troy Polytechnic* is indeed phenomenal. Started last spring, it has already gained a place in the front rank of college journalism. As early as last June the paper appeared with a large mathematical supplement. We are greatly pleased to notice the number of communications in the October issue; and we wish that our students would follow the example of the *Troy* men and use the college paper more and the bulletin board less. The *Poly's* alumni notes are very complete.

Heretofore it has been our intention merely to criticize and review the papers sent to us in exchange. From this time on, however, it shall be our aim to commend or condemn, as we see fit, such matters as may be found in the local columns of our contemporaries. In other words, the "college world," which was dropped from the list of our departments last year, will be partially revived and appear in our columns merged into "exchanges." We believe that this change will bring the exchange department up to the standard, which is reached when the department has become interesting, instructive and critical.

We are surprised to see in the columns of the *College Mercury* a clipping about a "Vassar Graduate." Couldn't the C. C. N. Y. boys find something better to do than hold up Vassar girls to ridicule and contempt? Enough harm has already been done the college by thoughtless reporters. In fact, the annual class excursion on the Hudson, if we are rightly informed, has now had to be given up because the newspaper men magnified girlish vivacity into indecorous boisterousness. For shame, *Mercury*! Let the girls alone. There are plenty of boy students within reach of your wit. [We suspect that the *Mercury* might properly have substituted "Madisonensis" for "Ex."]]



The other day as the Countess was hurriedly rounding the S. W. corner of Founder's, he suddenly collided with a Freshman. As the youths stood with downcast eyes, each holding his aching head, we chanced to catch the following conversation. The Freshman broke the profound silence by exclaiming: "Great Scott! how that made my head ring!" "That's because it's hollow," haughtily growled the Countess. "Why, didn't yours ring?" timidly asked the Freshman. "You fresh fool, no!" grumbled the indignant Countess. "That's because it's cracked," the fresh individual replied, as he started on; and he don't exactly understand yet why the Sophs. called on him that night.—*Haverfordian*.

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WHAT IS "THE FASHION?"
(Chapter I.)

THERE IS NO MARKED CHANGE OF FASHION THIS AUTUMN IN GARMENTS FOR MEN'S WEAR. THE FOUR BUTTON CUTAWAY COAT IS NOW SO GENERALLY WORN, THAT MANY MEN WHO OBJECT TO DRESSING IN WHAT IS TERMED "FASHIONABLE" ATTIRE NO LONGER AVOID IT. THE SACK COAT AND THE "PRINCE ALBERT" FRACK WILL NEVER CEASE TO BE WORN, WITH SLIGHT MODIFICATIONS OF SHAPE FROM SEASON TO SEASON.

WHEN IT COMES TO FASHION IN FABRICS, THERE IS A DECIDED CHANGE TO BE NOTED. IN WORSTED COATINGS, PLAIN DIAGONALS HAVE BEEN ALMOST ENTIRELY SUPERSEDED BY THE "CORKSCREW" OR "WHIPCORD" WEAVE A DECIDEDLY HANDSOMER FABRIC, SLIGHTLY MORE DRESSY THAN THE DIAGONAL, YET NOT TOO OBTRUSIVE FOR PEOPLE OF PLAIN TASTE. IT HAS COME TO STAY, NOTWITHSTANDING THE MAKERS OF SHODDY WOOLLENS HAVE FLOODED THE COUNTRY WITH "CORKSCREW" WORSTEDS THAT ARE AS WORTHLESS AS THEY ARE WORTHLESS. BETTER NOT BUY CLOTHES OF A DEALER WHO DOES NOT MAKE GOOD WHATSOEVER TURNS OUT WRONG AFTER REASONABLE USE. THAT'S OUR PLATFORM. CORKSCREW SUITS FROM \$22 UPWARD; NONE THAT WE CANNOT FULLY GUARANTEE.

BUT ALL MANKIND DOESN'T WEAR "CORKSCREW" WORSTEDS. THE YOUNGER AND MORE PROGRESSIVE WANT SOMETHING MORE DRESSY, AND FOR THEIR FAVOR THE "WIDE WALE" DIAGONAL STRONGLY PRESENTS ITSELF THIS SEASON. IT IS A BEAUTIFUL FABRIC AND IS SURE TO WIN. LET US SHOW YOU SUITS OF IT IN PLAIN AND FANCY COLORS, AT \$22 TO \$25, MADE IN FIRST CLASS TAILORING STYLE.

THIS IS ENOUGH FOR TO-DAY. A DESCRIPTION OF HALF THE PATTERNS OF MEN'S AND YOUTH'S STYLISH SUITINGS IN THE STORE WOULD FILL A NEWSPAPER PAGE AND DISCOURAGE THE READER; BUT A LOOK AT THE GOODS THEMSELVES WILL PLEASE THE EYE, AND ADD TO THE INFORMATION OF WHOEVER HAS CLOTHES TO BUY, EVEN IF IT DOES NOT INFLUENCE A PURCHASE. WE AGREE TO MATCH OUR TIME AGAINST YOURS IF YOU WISH MERELY TO LOOK, AND WILL KEEP THE STORE OPEN UNTIL TEN O'CLOCK, SATURDAY EVENINGS, TO SERVE LATE COMERS.

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* THE * Stevens Indicator

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* December, 1885. *

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HOBOKEN, N. J.:

* Stevens Institute of Technology. *

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THE STEVENS INDICATOR.

THE
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THE Stevens Indicator.

Vol. 2.

HOBOKEN, N. J., DECEMBER, 1885.

No. 9.

AN EVENING BY THE SEA.

Still and dull the evening air
O'er the water hovers.
Shadow-like, pass here and there,
A pair of lonely lovers.

Lovers dear, although so few,
One can find the world o'er,
But so many lovers true
Only by the sea-shore.

Where the billows kiss the land,
Shells and corals bring her,
There, outstretched upon the sand,
Cupid's subjects linger.

There, beneath the roofing sky,
Set with stars all glowing,
Near the ocean rolling by,
Rolling, ever rolling,

There, amid that darkened scene,
Wrapt in night, still comely,
Lovers on each other lean;
None but me so lonely!

Love I must, and love I will!
Taste I shall love's pleasures!
Near thee, ocean, have my fill
Of life's greatest treasures!

F. W.

NATURE A MODEL FOR ART.

Great works of art are the attempts of masters to represent thought. A perfect ideal has existed in the mind, and many years of labor have often been expended in trying to embody his ideal. He has been the most successful artist whose thought is highest, and whose production most vividly impresses this thought upon the appreciative observer. While, on the other hand, he best appreciates art who reads in the production before him the thought of the artist. Thus it is that the artist's profession becomes a power, and the study of works of art ennobling. For the purer the thought and the greater the skill of the artist, the more powerful his influence in refining the tastes of men.

In nature the artist finds his most perfect

model, since here he sees pictures which represent thought and which impress the thought upon all lovers of beauty. Here, the beautiful is set forth in hundreds of varying forms. How beautiful! How peaceful! How wild! and like expressions, are involuntarily uttered, upon beholding the different scenes which illustrate these thoughts. So perfect is the picture in nature, that thoughts of calmness, confusion, sublimity or simplicity, as the case may be, are at once impressed upon the mind of the observer. The supreme artist of nature has so arranged his objects and so laid on his colors that in it all and behind it all stands forth pre-eminent an inspiring and elevating thought.

Pen pictures of nature are among the most precious of our literary treasures. Many a cherished poem has been written when the author was inspired by the scenery around him and lost in admiration and wonder at the beauty of nature. Similes taken from nature give life, charm and perspicuity to our literature. Thus, as the study of nature has furnished so much that is beautiful to the art of expression by language, so it reveals to the painter the most perfect model for the art of expression by colors. "To him, who in the love of nature holds communion with her visible forms, she speaks a various language."

The first train that went over the Central Pacific Railroad was an excursion, consisting of many prominent men in our country, together with many railroad officials and their families. It was purely a pleasure excursion. The train was at their command, and stopped where it was desired, in order that the passengers might enjoy the delightful scenery and examine the wonderful engineering. At one time the train was stopped in the midst of the Rocky Mountains, and the whole party, consisting of about 150 persons, proceeded to a deep canon of wonderful beauty. On each side the rugged rocks rose like castle towers, turret above turret, to a dizzy height. The little company looked and felt like pigmies beside great giants. While standing in the presence of these mighty works of nature, and impressed

by the magnificence of the scene, they sang the long meter doxology. The grand sound rebounded from side to side of the rocky canon, echoing and re-echoing, until the loftiest turret took up the notes and flung from its jagged peaks the old refrain, "Praise God from whom all blessings flow." Every heart was touched. It was a more impressive service than the grandest cathedral of Europe, with its great organ and wonderful workmanship, could ever furnish. And so nature presses home its thoughts to us at times with irresistible force.

What better design can the artist desire, then, than the scenes and circumstances which have stirred men's emotions and inspired them with the purest and highest thoughts? And to what higher skill can the artist aspire than this, to represent his scenes with such reality that they shall impress the observer as nature itself?

COMMENT ON VIRGIL.

"They were going unseen in the lonely night through the shades and through the desolate abodes of Pluto and realms peopled with shades, as in the scanty light of the dim moon a journey is made in the forests, when Jupiter has concealed the heavens with shade, and black night has taken from objects their color. In front of the very entrance, and at the foremost doors of Oreus, Sorrow and avenging Cares have placed their couches; and pale Diseases, and sad Old Age, and Fear, and crime persuading Hunger, and squalid Poverty, forms terrible to be seen, Death, and also Labor, dwell there. There sleep the brother of Death, and joys injurious to the mind; and, upon the threshold opposite, death bearing War, and the iron bed chambers of the Furies, and frantic Discord, binding her viprous hair with blood red fillets. * * * * * Here is the way which leads to the waves of Tartarean Acheron. This torrent, turbid with mire and of vast depth, surges and casts all its sand into the Cocytus. A horrid boatman guards these waters and streams, Charon, of terrible filth, whose very long gray beard hangs neglected from his chin; his eyes are orbs of fire; a filthy garment hangs by a knot from his shoulders. He himself propels the boat with his pole and attends to the sails, and conveys the ghosts in his dusky bark; now an old man, but a god's fresh and blooming old age. Hither the whole streaming multitude was hastening to the banks. * * * * *

They stood, entreating to cross first, tended their hands with longing for the shore. But the gloomy boatman now these, now those, but the others perses and keeps far from the beach.

* * * * * As soon as the boat holds them from the Stygian waves, that distance, proceeding through the wood and directing their steps to the bank, he then first accosts them, and of his own accord challenges them: "Who are, who approach armed to our river tell me even there where you are, and your steps. This is the place of sleep and drowsy night. It is not for me to convey living bodies in my ship; nor was I, indeed, pleased to receive Hercules upon the lake as he approached me, nor Theseus, nor I although they were descended from and invincible in strength. He sought his hand to consign to fetters the Tartarus, and dragged him, trembling * * * * * He, wondering at the turn, turned his dark hued boat toward the land. He then drove other souls which were seated on benches, and clears the hold. At that time he receives the mighty Æneas boat. The boat of sewed hide groined beneath his weight and, full of chink with much water. At length he lands the prophetess and the hero safely at the river, amid the unsightly mire and dead grass."

It is stated by biographers that Virgil attempted to depict the miseries of Hades, he took a trip to Hoboken, and chanced that he set sail from Barclay and many of the most poetic descriptions of his grand old Æneid (especially the sixth book) contain allusions to it. In the course of my investigation of the subject, I unexpectedly came into possession of an old Dutch manuscript, dated 1612, by means of this last valuable historical document we obtain a very good idea of the port of New York by Virgil, Hades, or Tartarus, by the Dutch writer, hell, and by moderns, Hoboken. A Dutch writer, Hoedenschudtel, was a monk, travelling through America at that time was unknown to the world. It is a curious fact, and one entirely looked in histories, that the port of New York known as Barclay, as well as that of Hoboken, was colonized as early as the time by the Dutch, who, about the

almost exterminated by a plague of bed

Let us turn for our authority to the script and notice the remarkable coincidences between it and Virgil's description. late :

And, about the ninth period after the descent of Hölle, there came unto the stranger ; for he was strange with an strangeness. And, aforetime he came long, he caged himself in Barclay. But eaten inward by an evil demon, which stole through his stomach ; that he was to carry a liver pad. Therefore, de-he to Hölle ; and coming there he was or much was revealed to him upon the So he rearticulated his bones together, t him up out of the place after a day. hind him he left a dirty shirt as a sign rse. And that very day came there he land a plague of Jerseys, or animals g upon the fat of the land, and inhabit-bed both of the bachelor and of the . And they were for much time ; but squito did at last sting them unto death. me, I was spared. So be it."

seems to prove conclusively that Virgil this spot long before it was generally in the eastern hemisphere. He was ly the very old fellow with the soiled but in order to convince the reader of th of this assertion, I will point out rences.

il, according to his own account, passed Barclay Street, which, on account of its tions in the shape of rather substantial s" and wooden awnings, he compared rest on a stormy night. Jupiter is the ed form of the Dutch name Joppit, who yor about that time.

Virgil reaches the entrance to Oreus, house, where he encountered a filthy Barclayians, who had just returned bath in the Hölle reservoir. This ir was a favorite watering place of the of Barclay, and was situated on the of hills now known as Jersey City s. These Barclayians he designates by opprobrious epithets of his times.

within the ticket gate our hero is d, and falls. He sees a booth beyond, mediately he buys petrified caramels, n drops, and ginger ale, and hot coffee. evidently gripe him, for in the re-nce of his agony, he writes, "And he threshold opposite," etc. But he asten onward ; and now the slimy liver attracts his attention. He starts

to go through the second gate when an old man slams it in his face. Forthwith a torrent of abuse springs to Virgil's lips, some of which abuse he recollects when he comes to write his poem, in which he makes the gate keeper out an old tramp. Notice the irony : "A god's fresh and blooming old age."

Virgil's depiction of the independence of these old deck hands is very complete. The fact is, that they will only take a person over if they like him, and as their tastes are depraved, a respectable fellow has very little chance.

In the present instance, after the pilot has finished reciting a little piece he learned in his youth at the Hölle kindergarten, he fires all the common rabble off the old tub, and takes Virgil and his *little gift* on board. Then he matches denarii with the engineer ; after which he starts the boat, which is a little out of repair, not very much worse than it is now. I have not been able as yet to discover whether the "boat of sewed hide" refers to the "Wiekawken" or the "Rumsey ;" but I hope at some future time to follow out this subject with more care. And at that time I will begin where I now leave off—at the Hoboken River Bath, floating "amid the unsightly mire and dark sedge grass."

CHIC.

THE WORK OF THE JUNIOR YEAR.

Stevens has enjoyed for some time the reputation of being the best college of the kind in the United States. She has educated men from all parts of the Union, not to speak of many of other nationalities, to the profession of mechanical engineering, and will no doubt turn out many more good engineers.

But the question which proposes itself to most of us is, will she continue to deserve this reputation? As things are now, it seems doubtful. For progress at Stevens seems to have been for some time at a stand-still, and, what with the many institutions of the same character which are now growing up and coming into prominence, she will soon find that she is being left behind. It is to be hoped, however, that this will not happen—that the Trustees and Faculty will come to realize the fact that something must be done, and that soon, if we wish to retain our present standing.

The present year has begun and thus far continued with very little or no promise of better times, and affairs have been running

with such a lack of smoothness and system, that most of us are well nigh disheartened and tired of work that is so unsatisfactory. The Junior class is especially unfortunate; for, instead of this year being one of particular interest and advancement, it has, on the contrary, brought forth very little so far but discouragement and waste of time.

An examination of the Institute Catalogue of this year, and especially a glance at the roster, reveals what to us seems a peculiarly unfortunate distribution of the work in several of the departments throughout the four years of the Institute's course. We do not know under what circumstances the present arrangement originated, and it may be possible that some good reasons exist (of which, however, none but the authorities are aware) for the sequence of the course as now laid down. Certain it is, nevertheless, that in the minds of the larger portion of the students the distribution of the work is, to say the least, unfortunate, if not unwise. This may be said with particular justice of the work of the Freshman and Junior years. In the former case, because the time of the student is so little occupied, leaving altogether too much leisure; in the Junior year, because it is attempted to crowd too much work, and that, too, of a more important character, into the limited time at command. It is impossible to do it justice, and there is absolutely no time for recreation or leisure.

As now provided in the roster, the Freshmen are occupied with Institute work on only two afternoons during the week, these being devoted to shop work. The other afternoons are entirely unoccupied. It surely cannot be that this time is designed for purposes of recreation alone, for the average Stevens Freshman is, after all, a pretty hardy fellow, who can, without detriment to either health or comfort, stand considerably more work than is required of him at present. It is fair to assume that he can be required to do at least as many hours' work per day as is now customary at most of the preparatory schools in the country.

At the risk of assuming a privilege to which we are not entitled, we would venture to make a few suggestions which, if carried into effect in substance or as a whole, might do something toward giving the Juniors their much needed relief.

In the first place, it would be well to treat the subject of land surveying, and to afford practice in the use of the transit and level in

the field, during the Freshman year. should be taken up, if not at once, a immediately after the class has completed study of plan and spherical trigonometry is then amply prepared to take up surveying at once the lessons of the class in the practical work of the field, and applying one or two of the now unoccupied noons in profitable, as well as pleasant and healthful, work. There is no reason to think, why this work, so elementary in character, is made to occupy the valuable time of the first term in the Senior year, as now arranged. If this were done, the subject of Resistance of Materials could be taken up during the Senior year, either relieving the Juniors of so much time entirely, or enabling them to devote more time to advanced mechanics.

Again, our chief cause for dissatisfaction with the present course in chemistry, and the only possible reason why this study should not be begun, by means of lectures on theoretical and general chemistry, and by means of experiments, in the Freshman year, here as at other colleges. The subject of chemistry, as we know, is an important one to the student of engineering, and one to which due prominence should be given at Stevens. Metallurgy, especially of iron and steel, we ought to make come familiar with; but of this subject students really get very little. During three years of the four, we have time which we could very profitably devote to the study of chemistry. But for some reason, unknown to us save perhaps the Faculty, only one of the four years, viz., the Junior, is profitably employed. It is time that we take up chemistry in the Sophomore year, but, as at present conducted, it is hardly more than a mere waste of time. It is the opinion of all that laboratory work in qualitative and quantitative analysis should be taken up in the Sophomore year, thus leaving for the Junior year the study of such special branches as may be useful to the student in his chosen profession, instead of spending it, as now done, in a schoolboy-like squabble for marks.

It is possible, of course, that the limitations of the Institute would make it impossible to act favorably upon these suggestions, and, if this be so, the matter is much to be regretted. But it does seem, to a large majority of the students, that the roster is arranged with very little attention to a fair and even distribution of the work over the entire course. The complaint is almost universal, and should, if possible, be met,

a redistribution of the work will somewhat interfere with the plans and convenience of the Faculty. It is the sincere wish of all good students that the Faculty will soon see the necessity for action, and make some important changes for the better, especially with regard to chemistry.

R. N. B.

THE LUBRICATOR: AN OILY REVELATION.

The fair mud-rut, known as Hudson Street, sweltered in the noonday sun. So did Matthew, as he piled down the street toward the venerable pile, and swept through the gate with a sweep that took three cords of pickets off the fence. Now, verily, the day was shop work day, and Matthew had tarried him more than he should at his quail and Rudesheimer. When he saw the fodder hour was well nigh passed, he grabbed quickly a smoked herring and piled. Piled him where the merry Sophomore "swynked and labored" with his hands the livelong day, and he held himself aloof and did the grunting while they did the sweating. And when he had piled to the full extent of his piling, he found himself beside the blare-eyed piece of mechanism in the shop they call an engine. The engine looked four distinct varieties of looks as Matthew hove on the landscape, and said, reprovingly, "Matthew, Matthew, where wert thou? Let not 'arf and 'arf' call thee from thy post." And every student eyed him with an eagle eye and said naught, for all were waiting for "his nibbs." Then did Matthew sob one big saline drop of anguish that corroded the brass work on the engine. "No more," quoth he, "shall I be late;" and he grabbed the bell and started up. "Then cryde he 'Hor!' and every manner wight" bent to and began again the work of spoiling lathes and tools and drills and planes and all else that there was to spoil.

Now, Matthew is High Dignitary to the State of New Jersey and Chief Engine Mover to the Mayor of Hoboken; so, to keep his hand in, he occasionally put in a little practice. On this occasion he thought it would behoove him to haul about three thousand pounds of iron all around the cellar; so, collecting about all the students in the shop, he proceeded with them to the cellar, where was deposited an upright engine. "Now," said Matthew, in a voice with a trade dollar ring to it, "eu fellers 'ave to 'elp me move this hengine." Then he selected twenty-three men, and said

to each one of them individually, "eu take 'old 'ere and push this road." Then, when he had them all arranged so as to push one way, he said, "Let her go slow, Mulligan," and those twenty-three men pushed that engine in forty-six consecutive directions, and when each man found that he wasn't pushing like any one else, he kicked his neighbor for not pushing as he did. Then his neighbor kicked him back, and by the time he got him kicked back, his neighbor was getting in a kick for kicking him in the first place. Then each man tried to shove the engine over on to some other man, and when every man found every other man trying to shove it on to some other man, he immediately tried to pull it over on to himself; meanwhile every man making more noise than Matthew, and Matthew trying to make more noise than the whole mob. Now, at the latter disposition of forces, the old engine said "ta, ta," and caved in, every man getting the part he had the best grip on, and when he didn't have a grip on anything he got nothing but a big, extreme bump on the head, which presently heaved up to the size of a boiled nut. When Matthew saw his beloved engine cave, he quoted profusely from profane history and acted real vexed about it. Matthew did the heavy and general quoting, while each man got up a little private quote on his own account, best suited to his constitution. After surveying the ruins for about three hours, more or less, Matthew awoke from his abstraction and said, "Make 'aste, eu fellers, and gather up those parts. Eu 'ave no more sense than an owl." And they piled up the remains gently, and Matthew wended his way slowly up the step ladder, sometimes called the stairs, and walked into the shop to pulverize things generally, for he had acquired a pulverizing mood in the cellar.

"Fee, foo, fi, fum," he ejaculated, as he entered the shop, "I smell the oily Freshman," and he spied afar off the "missing link" making cigarettes on a lathe, and with meteoric rapidity he laid a heavy hand on the Freshman and joggled four pounds of tobacco down a knot hole. "What's this?" said Matthew. "I'm doin' a little work here," answered the Freshman in a voice like weak tea. "No one gave you permission to use this lathe. We can't 'ave anything of this kind; can't let you work 'ere; come when you belong 'ere; can't come any other time. Geister heim," and the "missing link" was missing. No sooner had he finished with the

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(Chapter I.)

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WHEN IT COMES TO FASHION IN FABRICS, THERE IS A DECIDED CHANGE TO BE NOTED. IN WOOLLED COATINGS, PLAIN DIAGONALS HAVE BEEN ALMOST ENTIRELY SUPERSEDED BY THE "CORKSCREW" OR "WHIPCORD" WEAVE A DECIDEDLY HANDSOME FABRIC, SLIGHTLY MORE DRESSY THAN THE DIAGONAL, YET NOT TOO ORNATE FOR PEOPLE OF PLAIN TASTE. IT HAS COME TO STAY, NOTWITHSTANDING THE MAKERS OF SHODDY WOOLLENS HAVE FLOODED THE COUNTRY WITH "CORKSCREW" WORSTEDS THAT ARE AS WORTHLESS AS THEY ARE WORTHLESS. BETTER NOT BUY CLOTHES OF A DEALER WHO DOES NOT MAKE GOOD WHATSOEVER TURNS OUT WRONG AFTER REASONABLE USE. THAT'S OUR PLATFORM. CORKSCREW SUITS FROM \$25 UPWARD; NONE THAT WE CANNOT FULLY GUARANTEE.

BUT ALL MANKIND DOESN'T WEAR "CORKSCREW" WORSTEDS. THE YOUNGER AND MORE PROGRESSIVE WANT SOMETHING MORE DRESSY, AND FOR THEIR FAVOR THE "WIDE WALK" DIAGONAL STRONGLY PRESENTS ITSELF THIS SEASON. IT IS A BEAUTIFUL FABRIC AND IS SURE TO WIN. LET US SHOW YOU SUITS OF IT IN PLAIN AND FANCY COLORS, AT \$25 TO \$35. MADE IN FIRST CLASS TAILORING STYLE.

THIS IS ENOUGH FOR TO-DAY. A DESCRIPTION OF HALF THE PATTERNS OF MEN'S AND YOUTHS' STYLISH SUITINGS IN THE STORE WOULD FILL A NEWSPAPER PAGE AND DISCOURAGE THE READER; BUT A LOOK AT THE GOODS THEMSELVES WILL PLEASE THE EYE, AND ADD TO THE INFORMATION OF WHOEVER HAS CLOTHES TO BUY, EVEN IF IT DOES NOT INFLUENCE A PURCHASE. WE AGREE TO MATCH OUR TIME AGAINST YOURS IF YOU WISH MERELY TO LOOK, AND WILL KEEP THE STORE OPEN UNTIL TEN O'CLOCK, SATURDAY EVENING, TO SERVE LATE COMERS.

PERSONS FAR AND NEAR WHO CANNOT VISIT THE STORE ARE INVITED TO WRITE FOR OUR FALL PUBLICATION, "WHAT TO WEAR AND WHERE TO GET IT;" ALSO FOR SAMPLES OF MEN'S AND BOYS' CLOTHING.

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ceive the most heat while the upper end of the tube is kept cool, and it may also be closed with the finger to prevent air from entering.

The phenomena which may occur are either of a physical or chemical nature.

The physical phenomena comprise :

a. DECREPITATION, by which the substance breaks into a large number of minute particles, on account of some exceedingly small portions of water in the substance ; importance should not be attached to this phenomena, as with the same substance it may or may not occur.

b. FLUORESCENCE, which occurs in several minerals, and is probably due to some internal change in the position of the molecules.

c. EVAPORATION of uncombined water, which is generally small in amount, so as to produce simply a misty appearance in the tube, which need not be considered.

d. A change of color while heating, without an accompanying chemical reaction.

The chemical phenomena are more important, and consist of :

a. CHARRING, which shows the presence of an organic substance.

b. SIMPLE DECOMPOSITION, by which a gas is given off. This is usually indicated by some change of color in the substance, or the odor and color of the liberated gas, and also by its reaction on litmus paper.

c. SUBLIMATION, which may be complete or partial, consists in the formation of a white or colored sublimate in the cooler part of the tube.

d. EXPULSION of the water of crystallization, which condenses in small drops in the upper part of the tube, and should be tested for an acid or alkali by means of litmus paper ; when the substance is a salt containing much water, it generally boils in the same.

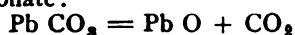
To illustrate the physical changes, a single example will suffice. Let a piece of fluor spar be heated in the tube ; it will decrepitate, change in color to a grayish white and fluoresce, which latter phenomena is best seen in the dark. No chemical change is produced by the heating.

Of the chemical changes, the following may serve as illustrations under the various heads :

a. Charring. Heating some sodium tartrate :
 $\text{Na}_2\text{C}_4\text{H}_4\text{O}_6 = 2\text{NaHO} + \text{H}_2\text{O} + \text{CO}_2 + \text{CO} + 2\text{C}.$

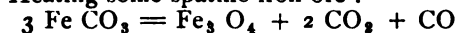
The substance is blackened by the liberated carbon.

b. Simple decomposition. Heating some lead carbonate :



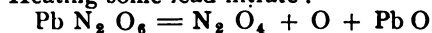
Carbonic acid is given off, and the lead oxide is red while hot and yellow when cold.

Heating some spathic iron ore :



The ore being light brown, changes to black and becomes magnetic.

Heating some lead nitrate :



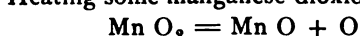
Characteristic odor and color of the nitrous oxide fumes are produced.

Heating some ammonium sulphate :



Indicated its odor and coloring litmus from red to blue, and red again when the SO_3 begins to act.

Heating some manganese dioxide :



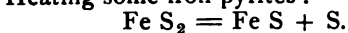
The oxygen is indicated by the glow produced when a piece of charcoal is introduced into the tube.

c. Complete sublimation takes place with salts of ammonium, arsenic or mercury, which form a white sublimate in the cooler part of the tube ; to decompose the substances containing these elements, cover the substance in the bottom of the tube about $\frac{1}{4}$ inch high with *dried* soda, and heat gently at first ; the ammonium will be indicated by its odor and changing moistened red litmus to blue. Arsenic forms a black mirror in the interior of the tube above the soda, while the mercury forms small globules which may be seen through a lens or combined into one large globule by rubbing with a stick of wood, or else, if the quantity is very small, a piece of gold leaf may be amalgamated by the mercury, and thus, by its change of color, proving the presence of the latter element.

Partial sublimation takes place when the test substance contains one or more volatile elements, either combined or mixed with one or more involatile elements ; when combined, however, the volatile element must be present in a higher proportion than it is entitled to by its equivalents ; the extra molecule of the volatile element is but lightly attached, and therefore easily separated.

The sublimates are usually colored, and are produced when the substances contain sulphur, arsenic-sulphide, antimony-sulphide, arsenic, mercury-sulphide and mercury.

Heating some iron pyrites :



The sulphur condenses in brown drops in the middle of the tube, and becomes yellow on cooling. When sulphur and arsenic are present, the sulphide of arsenic which is pro-

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WHO has never felt the pang of parting from one he has learned to esteem and love? And how great must be his sorrow when obliged to part forever! Aye, can all of you comprehend that word in its entire meaning? To part forever! Even now are we preparing for one of these heartrending separations—a separation that knows no end, not even in that glorious future of the promised land. For twelve months has it been our daily companion; for twelve continuous months has it shared our woes and our pleasures, our failures and our successes. Shall we not, at least for a moment, revert to all its kindnesses, its faithfulness and its blessing? No! Man's ingratitude o'erleaps itself; and although he owes this friend all, and could not have existed without him, he lends his hand to strike the last blow at that faithful breast. Worse than that light hearted race that cheered, *le roi est mort! vive le roi!* he will soon exclaim, without even mentioning the dead: Long live the new year!

Let us, at least, be more thoughtful. Well known as the past year is to us, shall we think less of it because the new one veils with an

impenetrable shroud an unknown future, pregnant, perchance, with an awful fate, perchance with smiling loveliness? Shall we spurn the old year because it has become absolutely useless, and shall we throw it into the darksome floods of Lethe without a moment's golden memory and a grateful recollection? The dying year of eighty-five has done its tiny share in the grand work of eternity. Countless are the blessings it has showered on mankind; numerous as the fleet seconds that, following each other like bead on bead, have formed this shining string. But, we hear the pessimist exclaim, did it not come filling this small and shallow chasm between the two eternities, with promises more numerous and bright than those it has kept? Nay! he says; let it flit by, as many have done before, and as many shall do after it; beware! expect not too much from the false smiles of the baby year, come to supplant the old, and continue to decoy man by its vacant promises. Sufficient unto the year is the evil thereof! Yes, indeed, we answer; but the good it has done us, we must remember. Kind reader, when, on New Year's Eve you will wait anxiously for the death of this old friend, and balance up your accounts, charge all the good to the dying poor and all the bad to yourself. For, remember, that just as time promises to turn the leaf, so you have often resolved, or promised to yourself, to do the same. Happiness comes to him that will receive her! Still, if human wishes can do aught for you, perhaps in cheering you up for the coming struggle, receive ours that come from the heart and cannot help but reach yours. A HAPPY NEW YEAR! And may the next year prove one of more prosperity, not only to you, but (excuse our selfishness) also to the INDICATOR.

WE put rat poison on the turkey dressing of the compositor who forfeited his life at our hands for writing years instead of gears, in connection with Prof. McCord's name; also for making us say, "Now, subscribers," instead of "non-subscribers."

THE GLEE CLUB.

Glee Club has reorganized and is now singing regularly. At a meeting recently was decided to have no outside musician, it being thought that the club be an affair of the students, rather than a lar outside affair. Consequently, the ll proceed this year, under the leadership of Mr. Cotiart, whose popularity among students, we are sure, will recommend the club to all of us as an institution which will be supported by the united force of the college. It is hoped to give one concert every week, this season, for the students and friends. To make this a success, it is hoped that all should lend a helping hand, going to the old rule, that the success of an enterprise concerns each student's person.

Through the courtesy of the officers of the Men's Christian Association, the Glee Club is the use of the Y. M. C. A. rooms for practice, twice a week. The hall is large and possesses great advantages for singing, so practice proceeds rapidly and successfully. The club wish here to express their thanks to the officers of the association for kindness.

Glee Club has been greatly strengthened this year by the addition of two more members on each part, thus making the total in the club somewhat over twenty. The membership has not been settled yet, that we are not able, in this issue, to give the names.

COMMUNICATION.

Editors of the Indicator :

We call attention to a matter which has seemed to me disagreeable, to say the least. It is the way in which visiting teams are treated by students. I do not mean Steven only, for I believe it is an almost universal habit. Cheering is always one sided; cease when there is a decision on the part of the referee which does not suit the home team. That unfortunate one is hissed, even when advice from the on lookers, in a body, you hear cries from several in concert; a shower of remarks. Perhaps, it is thought the player will be encouraged, but it shows its effect at such remarks seemingly in vain.

The custom seems to prevail on the football field alone. At lacrosse or base ball one very seldom hears any such things, and there seems to me to be no reason for it at any game. We all like to see good playing in any game, and it does not seem fair to give credit to that made by one's favorites alone.

K.

INDICATOR CARD.

Everything in perfect order. Smooth work in all parts of the engine. A little too much "cushioning" in the Freshman class. The Professor of Engineering regaining his customary strength. Theses half finished; Seniors, too! Examination here! Spirits high, marks low! Sophomores orderly and quiet; Juniors eating, drinking, sleeping, dreaming, working, etc., by day and by night, from Monday till Sunday, in the Chemical Laboratory; stagnation in the S. S. S. Not oil enough in the Glee Club, and consequently too much noise, and no real work! The Freshmen that have been distilled over from the H. S., practising for wire pullers, and future political bosses! Thanksgiving *after* exam.! "Graphical Statics" made very clear.

Still engine needs rest. Mud in the boiler? Turn the rascals out! Will come back next year. Make your resolutions early, and keep them late. Do not waste fuel or gas. Go home and eat enough to keep you alive till Easter! Be merry! So long!



The foot ball season closed with the game played Saturday, November 28, 1885, and the INDICATOR wishes to make a few observations, hoping that some of the suggestions will be carried out by future teams.

There can be nothing but praise for the spirit displayed by the team, and the manner in which they have faithfully worked. The INDICATOR noted at the commencement of the season that the men from which a team was to be selected were of the best, and now, at

the close, we see each man developed into a good player.

Still, some one asks, Why the defeats they have suffered? and we propose to answer.

A team, let it be ever so good, needs more than its own strength to win games; it should receive that support from the management that will make each individual of the eleven feel that his best interests and the success of the team are thoroughly cared for. This support was not given, and the result, naturally, was repeated defeats. Without exception, the choice of referee, the point of most importance, was either neglected entirely, or else attended to at such a late hour as to be of no avail. But once during the whole season did we have a referee who was thoroughly conversant with the game, and he was obtained through the efforts of the captain of the eleven.

The men whose business it was to select a referee utterly failed in every instance, and every one knows that to put a team in the field with an inefficient judge is but coveting defeat.

Is it necessary to point to the Lafayette game, or to the Pennsylvania game, to convince one of the fact of the negligence of the officers of the Association?

It was folly for the eleven to play against such odds, and they deserve the greatest credit for remaining in the field throughout the season.

Captain Hart should have refused to finish the Lafayette game. The rights of the eleven are to be considered before all else.

The only point open to criticism in the team was the captain's failing to coach his men during the game. Each man played a splendid individual game, but their efforts would prove of no value, as the team needed judicious directing during the progress of the game.

Pennsylvania.

Played on the Stevens grounds, Saturday, November 7, 1885. The game was called at 10:30 a. m. Stevens scored the first point, a touch down by Capt. Hart, he carrying the ball from mid field to the universities' goal. In quick succession the university made three touch downs, time being called, with the points 18 to 4, in favor of Pennsylvania. In the second half, Stevens played a faultless game, forcing the ball well down into Pennsylvania's territory. The points scored during the half were touch downs for Pennsylvania, and goal from field for Stevens, the

game ending with Pennsylvania winning points, to 9 for Stevens.

The referee, unfortunately, was not acquainted with the rules of the game, and a great deal of dissatisfaction was caused by his decisions.

Rutgers.

A game was arranged with Rutgers on Sunday, November 14, 1885, the result of the correspondence and personal interview even this did not deter them from coming within a few days of the game. It was probably another off year with them, and they preferred breaking the engagement with Stevens and playing Lehigh, choosing a victory rather than a *sure defeat*. But WHIPPED RUTGERS! What a consolation for Lehigh, with her persuasive orators coming to argue at each decision, reminding of a pack of noisy children; and *athletic* Rutgers. Do they teach them of morality at New Brunswick?

Lafayette.

The return game was played on Stevens grounds, Wednesday, Nov. 18, 1885, putting her best men in the field, with determination to send the visitors home isolated. The game was well played on both sides, but Stevens clearly had the advantage. Cotiart made the first touch down by a run. Lafayette shortly scored a touch down, after two decisions by the referee.

During the half, Stevens made two touch downs, the score standing: Stevens 12, Lafayette 6.

Play being resumed, Cotiart made a fine run, passed the ball to Campbell, who carried it to Lafayette's line, where Campbell made a touch down. From a punt by Campbell, Kawn obtained a free kick about the middle of the field. From here he made a well merited point. From now on Stevens played the game, and between his knowledge of the game and his determination to be impartial, he gave Lafayette three touch downs. Considering the referee was a fair man, Lafayette had reason to congratulate themselves! A game that was edged to be a victory for Stevens, is heartening to lose through the mistake of an individual.

A great many ladies, friends and members of the Institute, witnessed the funeral of the game.

Lehigh.

Saturday, November 21, 1885. Lehigh won from Bethlehem and presented

fine appearance that doubts were entertained as to the result of the game.

The game was free from roughness, and consumed nearly the whole afternoon, the visitors assuming alternately the functions of a foot ball and a debating society. It was decided by a *kicking* game, but Lehigh "winded," and Stevens won by 20 points to 4.

C. C. N. Y.

The first time for many years we met our old friends. Their team lacked practice, but has several good players. Stevens worked hard through the whole game, and won magnificently—162 to 0—the largest score ever made on the foot.

Brooklyn Hills.

Saturday, November 28, 1885, the final game of the season was played. The visitors presented a good team.

The game was lively throughout, the Brooklyn men tackling splendidly, and the Stevens team surprising themselves by several good runs.

Sheldon's running and dodging was the feature of the game. In the first half Stevens secured touch downs, T. Hart kicking two fine goals. In the second half Brooklyn was forced to make a safety score by points. Stevens, 14, Brooklyn, 0.

PERSONALS.

'77.

EDWARD A. WEHLING has been elected a member of the American Institute of Mining Engineers.

'78.

RICHARD GERNER, B. O. T., died of consumption, July 30, at his residence at Hounslow, Middlesex, England, aged 29 years.

BROWN AYRES.—With the change of the University of Louisiana into the Tulane University of Louisiana, Prof. Ayres has also been transferred, and now holds the chair of physics and astronomy.

'79.

KELLY-KENNEDY.—A charming wedding was celebrated in Hoboken, N. J., on Tuesday, October 27. Mr. James F. Kelly, the electrician of the Electrical Supply Company, was married by the Rev. P. Corrigan to Miss Julia Kennedy, daughter of the late John

Kennedy, for many years County Clerk of Hudson County. After the ceremony at the church, the young couple held a reception at the residence of the bride's sister, Mrs. Rohder, only the relatives of the contracting parties being present.—*New York Sunday Times.*

HENRY F. DAWES is chemist at the Port Henry Iron Works, Port Henry, N. Y.

'82.

EDMUND P. LORD is in the Department of Tests, Pennsylvania R.R., at Altoona, Pa. In our October number a typographical error occurred, making us say *Law*, '82.

'83.

RANDOLPH, who, since his graduation, has been Superintendent of the Testing Department of the Erie R.R., at Susquehanna, Pa., has recently been appointed as General Manager of the Florida R.R. and Navigation Co.'s Railroad, with headquarters at Fernandina, Fla.

L. S. RANDOLPH is Master Mechanic of the Florida Railway and Navigation Co., at Fernandina, Fla.

'84.

WILLIAM H. BRISTOL is appointed Instructor of Mathematics, at Stevens Institute of Technology, commencing with next term.

H. DEB. PARSONS is Mechanical Engineer and Marine Architect, at 35 Broadway, New York.

'85.

E. MUNKWITZ is with E. P. Allis & Co., Reliance Machine Works, Milwaukee, Wis.



Bone, boys, bone!

"Take another color."

Our mystery—Chem-mystery.

Are you ready for the questions?

A merry Christmas and happy New Year!

Query : Where is the laboratory price list ?

"Now let us torc about the effects of a torc."

Die Anna Lise and Lepold were married last month.

United they stand, divided they fall—B-t-s and his bag.

Look through the advertisements in the INDICATOR, and get your presents ready.

"The green and the red forces are in equilibrium." Does he mean the Irish and English ?

We recommend to the "class in surveying" to invest in a type writer, with different colored ink.

Searching for an unknown : Looking for a Senior who knows what subject to take for his thesis.

Prof. Denton was seen in the "library" one day last month. Verily, truth is stranger than fiction.

And now the eyebrows are flourishing on the upper lips of the Freshmen. Won't they surprise ma ?

"Yes, sir; there are two maximums, only one maximum is more maximum than the other maximum!"

Vanderbilt should not sit behind Capt. Hart in class, as even when he stands up it is hard for the Professor to find him.

The Juniors have just finished the subject of *cribwork*. Some classes are well up on it, even in their first examination.

In heaven above,

Where all is love,

There'll be no chemistry there.

Preserve seems to be the most industrious man in the Senior class, judging from the manner in which he fills the black board.

The Juniors were all *smiles* when the Professor read to them "Smiles' Lives of Engineers." What lots of spare time we have.

Prof. : "What kinds of machinery are used for raising building materials?"

S. : "Derricks, cranes and—hod carriers."

A specimen comment :

"Professor, I think he did not give the symbol right ; it is Na_3 —a Na_2 —a something Cl_6 ."

Some of the Freshmen have begun canes. They are probably afraid of in for tramps if caught without a vis of support.

We wish those Sophs. that are v carpentry would not try to find th tion of a *plane* with the grindston ways bad for the plane.

Prof. : "Mr. G., describe a hydro Mr. G. : "A hydrometer is a hol thing."

Prof. : "So is the earth. Next."

There are at present sixty stude Freshman class. A curious indivi us the other day whether we thougl of them would remain till graduatio

Mr. Ballantine took a picture of ' think is hard to beat ; of course, remarkably fine looking class to s made his task easier ; still, he deso credit.

The Freshman that sent us the story, entitled "Mamma's Tree," the manuscript with our "extreme : he searches our waste basket or postage.

Prof. : "What is the zero of the scale?"

Student : "Why, it's the zero."

Class applauds, and temperature rises to the blushing point.

Prof. Wood has demonstrated the the temperature of space is only the absolute zero. This tends to the Esquimau's idea of sheol is nearer the truth than ours.

Attention, Juniors ! Buy the r "The Complete Commentator," W-e-t-ey & Co. Filled with the m comments, showing deep research ir of chemistry. Price, 75 cents.

Prof. : "Yes ; some clay banks treacherous. When dry, they will most perpendicular ; but, when so fall very easily." Junior (whisper neighbor) : Just like some men.

By the manner in which "Deaco the foot ball field during a game, w must be working for a position : Deac. would not look bad in a whit and a cotton umbrella under his ar he ?

The Seniors have "finished" with turbines and will continue thermodynamics for the rest of the winter; it is thought that the latter will prove more congenial, helping to keep them awake and warm throughout the longer winter nights.

No longer will the Hobokenites be disturbed in their peaceful meanderings through the classic streets of this town, by an indiscreet telescope whose line of collimation passes through their hearts and a Senior's searching eye!

"Inertia is a remembrance of the ignorance of the past." It is defined as passiveness. Thus, if we pour water into a barrel, the barrel remains passive. Junior's version: If we pour beer into a Hobokenite, the Hobokenite remains passive.

Prof. of Chemistry, lecturing on oil of vitriol—"I dropped some on the cover of a book some years ago, and it still seems to absorb moisture from the surrounding tissue. In fact, I may say, that this peculiar physical property *never ceases to stop.*"

It was the first game of football she had seen, and it horrified her to hear the players cry "Held!" She turned to the mild-eyed youth at her side and said: "George, could you not induce the young men to say sheol; it's so much more cultured, you know."

"Question 87"—Grand double shuffle by '87. Professor looks scared, and class stuff handkerchiefs in their mouths, get down behind their collars and look daggers at their note books. A member of the class explains. Professor's looks relax into a broad smile, and he proceeds to write.

Prof., to Mr. M., who has been talking to his neighbor: "Mr. M., can you explain that?"

Mr. M.: "No, sir; I can't understand that in the book."

Prof.: "Well, manifestly tain't the fault of the book," and gives him zero.

What frightens the Senior by night and by day?

What makes him shudder with awful dismay?

It scares all his wits—not that he has many—

But losing them all, he will not have any.

He walks in a nightmare at every hour;

And sleeps with a day dream like Byron's Giaour.

To be in that terror, 'pon honor, no bliss is—

The poor fellow's thoughts run dry on his thesis.

Two students met on the ferry boat the other day. "It's a high tide," says one of '88 to the other, and went on explaining all about the relations between the moon and the tide in a most elementary manner. "You

see it is this way—you are an '89 man, aren't you?" "No," replied the other, "I'm an '87 man."

Exit Soph., very crestfallen, while Junior chuckles.

Professor (in calculus recitation, to student who has worked example on board incorrectly): "What value did you find for u in the first equation?"

Student—"ax plus 2 ab."

Prof.—"Substituting, in the final equation, that made you equal zero ($u=0$), did it not?"

Student—"Yes, sir."

Class indulge in mirth; but the professor, placing a "goose egg" opposite the name of student, doesn't see the joke.

We are glad to see the commenting, as formerly carried on in the Junior class, stopped. It has been the source of much ill-feeling and unfair play, and, in one instance at least, made such an impression on a student that he felt obliged to continue it in another department. Thinking that the loads likely to be placed upon a bridge had not been fully stated by a classmate, he informed the Professor that "something had been omitted; sometimes elephants cross a bridge. He was immediately sat upon.

He was a gay hearted youth, with blond down on his upper lip, and he hummed an air from the "Mikado," as he tripped lightly into a Washington Street store, in search of a piece of music.

"I would like 'Only to See Her Face Again,'" said he to the good, matured looking German in attendance.

"You can see her, and you can haf her. I marry dot girl now six months, and I don't got no more hair on mine hed any more. Oh, yah! Lena! Lena! come right away quick here."

Professor Leeds delivered a short but very interesting discourse to the Junior class on the subject of phosphorus in the human system. How much better it would be for the members of the class to cease picking each other to pieces with miserable little comments and give the Professor a chance to lecture to us. In this way those who do not care to comment would spend the time with profit and enjoyment to themselves; whereas, now they are obliged to sit and listen to a certain few who seem to think that a thorough knowledge of chemistry lies in being able to tell the Professor that "Mr. so and so said *water*, while the *book* says $H O_2$."



The *Vassar Miscellany* says: "The Sophomores entertained the Freshmen in the college parlors, etc."

We notice in the *Tech.* an article on "Student Life in Heidelberg," which is both instructive and interesting.

The Junior class of Massachusetts Institute of Technology is to publish an annual called "Technique," about Christmas time.

In the account of the Lafayette-Stevens foot ball game, the *Lafayette* says: "The playing of Cotiart, Gilchrist and Hart was especially noticeable."

"In Sweden a divorce may be obtained by a wife from her husband if she can prove he is an inebriate or that he has been twice convicted of drunkenness."

Mechanics for November has an illustrated paper on the "Isle of Wight Steam Ferry." As a novel use of commonplace mechanical arrangements, this ferry is noteworthy.

The *Argonaut* says that it is too much trouble to open tightly rolled exchanges. To be sure it is some trouble, but we would never exchange with such a worthless paper as that.

Hereafter the exchanges will be placed upon the table in the library. We hope that the students will notice the INDICATOR stamp on the papers and return them to the tables after reading them.

Two of the W. T. I's. so-called "Scientific Notes" are worth repeating: "According to W. Schinkewitsch, a new genus of fleas, the *Vermipsylla Alakurt*, has been discovered. Heaven defend us!"

The *Beacon* has appeared again in its attractive dress, after a long, long absence. This absence, we suspect, is due to the faulty management of our exchange column some time ago. We hope, however, that the *Beacon* will continue to visit us.

The *Chironian*, a sixteen page bi-weekly, comes regularly to our table. The articles are mostly written by professors and graduates, and embody the results of their experience.

We are not at all surprised that such a valuable paper should be copyrighted.

Students are admitted into Michigan University upon the presentation of satisfactory diplomas from their respective schools. The system is said to work well. The University is hunting around for a new medical building, an art hall, and larger recitation rooms.

We were taken by surprise when we received the *Eclipse* for October. It has taken upon itself a new cover, and the typography shows marked improvement. We were particularly impressed with a beautiful specimen of rhythmic prose entitled, "Virgil's Prophecy."

The *Virginia Literary Magazine* is before us, and we are enjoying a treat in the perusal of the articles, among which are "The Loves of the Poets," "The Ancient City," and an oration entitled "A Congress of Nations." In this last the author shows a great deal of ingenuity in tracing out the early attempts at such a federation, and in predicting the peaceful times to come, when, as he quotes,

. . . the war drums throb no longer, and the battle flags are furled,
In the parliament of man, the federation of the world."

The *De Pauw Monthly* comes to us with a new cover. It is also more literary in appearance. We object, however, to the uncut pages. This, for a college paper, seems too much like forwardness. It seems as if, in order to be literary, it were necessary to leave the pages uncut; "it's English," etc. Besides this, it is very inconvenient. We were so pleased with the cover that we sat down with the expectation of finding cause for congratulation within the covers. It reminds us of the time when we gave up eating hickory nuts, because, while the meat was very good, it was too much trouble to pick it out.

There is still running on the Western and Atlantic Road, in Georgia, hauling a passenger train, the old locomotive, General, which, the *Railroad Gazette* says, was the pursued party in one of the most exciting chases on record. The locomotive was carried off by a small party of Federal scouts during the war, while the engineer and firemen were at dinner, and the train was stopping at Big Shanty. The pursuit was kept up for over 100 miles before the engine was finally recaptured, and she was only abandoned when entirely out of fuel and water, and the journal bearings had been almost entirely melted out, the supply of oil

having also run out. In the chase, this General and the pursuing engine probably made the fastest time ever run on a southern road, although all parties were too much engaged in the business on hand to keep any record of the actual speed.—*Ex.*

ENGINEERING NOTES.

The Stevens battery, built during the war, cost \$4,700,000. It never touched the water. When sold it brought \$55,000. It cost \$31,000 to break it up. The wood work was the finest Georgia pine, in a high state of preservation. That used in the sides of the hull was 5 feet 6 inches. These were dovetailed together and secured by bolts 4 feet long. In and around these creosote was packed in large quantities, and, although this wood had been in place for more than twenty years, it was found to be in better condition than when freshly cut. All the skill of the workmen and the strength of the tools could not force the layers apart, and the work was finally done by burning. It was found to be exceedingly dry and susceptible of high polish, and a large quantity of it has been used in the new cottages built and building on the south shore of Long Island.

In the hold were two engines of 6,000 horse power, each made expressly for twin screws. They were sold to the works whence they came. In addition to the two propelling engines there were sixteen auxiliary engines, which were taken to coal mines in Pennsylvania, where they are still used.

GAS ENGINES vs. STEAM ENGINES.

In an article extolling the good qualities of gas engines Denny Lane says, in the *English Mechanic* :

"With such advantages, it may be asked : Why does not the gas engine everywhere supersede the steam engine? My answer is a simple one : The gas we manufacture is a dear fuel compared with coal. Ordinary coal gas measures 30 cubic feet to the pound ; 1000 cubic feet, therefore, weighs 33 lbs.; and taking the price at 2s. 9d. per 1000 cubic feet, it costs 1d. per lb. The 30 cubic feet at 6300 give 190,000, all available heat. Although good coal may yield 14,000 units by its combustion, only about 11,000 of these reach the boiler ; so that the ratio of the useful heat is $\frac{1}{3}$. The thermal efficiency of the best non condensing engine to that of the gas

engine is in the ratio $4\frac{1}{3}$. Multiplying together these two ratios, we get

$$\begin{array}{r} 11 \quad 4 \quad 44 \\ - \times \quad = \\ 19 \quad 22\frac{1}{2} \quad 4.28. \end{array}$$

"That is, speaking roughly, 1 pound of gas gives about ten times as much power as 1 pound of coal does in a good non condensing engine. But at 18s. 1d. a ton we get 10 pounds of coal for 1d.; so that with these figures the cheapness of the coal would just compensate for the efficiency of the gas. As to the waste heat passing away from the engine being utilized, here the gas engine has no advantage ; and so far as this is concerned, the gas is about eight times dearer than coal. The prices of gas and coal vary so much in different places, it is hard to determine in what cases gas or coal will be the dearer fuel, considering this point alone."

A temperature of 570° will produce a dark blue color on polished steel, and 590° a pale blue. Oil or grease of any kind will answer for drawing the temper of cutlery. The temper for lancets is obtained at 430° F., axes at 500°, swords and watch springs at 530°, small saws at 570°, and large saws at 500°. Copper colored spots are not produced by tempering, but they may be obtained on the polished surface of steel by immersing the article in a solution of sulphate of copper.



A NEEDED REFORM.

Air—Tit Willow.

There are some men in the R. P. Institute,
Reform it, reform it, reform it,
Whom a certain custom does not at all suit,
Reform it, reform it, reform it.

This business of copying notes each day,
Which takes up his time from his studies and play,
Makes each Senior angry, and leads him to say
Reform it, reform it, reform it.

It's easy for the Prof. to print all his notes,
He should do it, should do it, should do it;
In favor of printing them every man votes,
He should do it, should do it, should do it.

These men need all their time to do other things,
Besides spending it in work which no profit brings;
And that's why each member of '86 sings
He should do it, should do it, should do it.

—*Troy Polyt.*

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WHAT IS "THE FASHION?"

(Chapter II.)

IN CHAPTER I. WE MENTIONED THAT THE "WIDE WALK" DIAGONAL IS THE MOST ELEGANT AND NOVEL FARRIE FOR MEN'S WEAR INTRODUCED THIS SEASON. THE FASHIONABLE TAILORS ARE CUTTING THEM, AND THE MOST CAREFULLY DRESSED SOCIETY MEN ADOPT THEM, HENCE THEIR STATUS IS FIXED; AND THE PLAINED "CORKSCREW" WORSTED HAS A RIVAL FOR POPULAR FAVOR. WE SELL CUTAWAY SUITS OF "WIDE WALES" AT \$25 TO \$35—BEAUTIES. WITH THE BEST TRADE OLD FASHIONED CASHMERE ARE ALMOST ENTIRELY SUPERSEDED BY FANCY WORSTED SUITINGS, WHICH PRESENT A HIGHER FINISHED SURFACE AND SHOW TO BETTER ADVANTAGE THE NOVEL EFFECTS IN PLAIDS AND CHECKS WHICH ARE NOW "THE THING" FOR BUSINESS SUITS. WE SELL FASHIONABLE SACK AND CUTAWAY SUITS AT \$20 TO \$30 THAT HAVE JUST AS MUCH "TONE" ABOUT THEM AS HAVE CUSTOM SUITS ONE THIRD DEARER.

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* January, 1886. *

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~ A Case of Greenness ~

©© Freshman {after looking intently at the automatic lubricator for $\frac{3}{4}$ of an hour} "What gets me is why that little ball stays in the same place." ©©

THE Stevens Indicator.

Vol. 3.

HOBOKEN, N. J., JANUARY, 1886.

No. 1.

WINTER SONG.—FOR JANUARY.

FROM THE GERMAN.

Not a flower is to be seen ;
But the hardy wintergreen,
Peeping through its silver veil,
Shivers sadly in the gale ;
And its ruddy berries glow,
Ripening upon the snow.

Ah ! no song of happy bird
In the wild wood now is heard ;
But the mouse's winter cry
To our ears come sounding high,
As it runs around and round,
Seeking food upon the ground.

Love has left his favorite wood
Where the little birds abode ;
Where the green shade gave them rest,
Each within his mossy nest.
Love prefers a chamber warm
To the peltings of the storm.

Coldest month of all the year,
I defy thy ragings here ;
To my love sports I can steal,
Where thy frost I never feel.
Rule forever—I've no fear,
Coldest month of all the year.

G. P. QUACKENBOS.

OUR PROFESSION IN DANGER.

There has been a great deal of discussion going on lately among mechanical men, as to what the title of M. E. means, and to whom it is applicable. There is published, in the exchange column, a letter in regard to this subject, which appeared in the *Mechanical Engineer*. Truly, our profession is in danger of deteriorating, when we read a statement like the following, and are unable to deny it : "Any man who chooses can write the title M. E. after his name—stage carpenter or stage driver." Soon the man who manipulates the street sweeper will sign his name (if, indeed, he is able to write), Patrick O'Hoolihan, M. E. It looks well in print, doesn't it ?

The reasons for such a loose state of affairs are these : 1. Comparatively few people un-

derstand what an M. E. really is. 2. There is a disposition among a great many to steal any titles which are not defined by law, and to appropriate them to their own gain. 3. The objection is urged that, if the title M. E. is confined too strictly within its real signification, men well known in the mechanical field will be forced to drop the title which they (very properly, I think) use.

In the November *INDICATOR* was published a letter by William Kent, M. E., to the *American Machinist*. Mr. Kent, one of the most prominent graduates in the engineering profession, has, in a very clear way, shown what the title means. I quote : "1st. That the letters M. E. mean not that the man *is* a mechanical engineer by virtue of his having labored as such, but that he possesses a diploma conferring the degree of mechanical engineer, which diploma has been conferred upon him by a college having authority by law to confer such a degree. 2d. That no other person has any legal or moral right to use them. 3d. That, while there may be no penalty * * * the man who uses them (*i. e.*, the letters M. E.), and who is not the possessor of a legally conferred diploma, which entitles him to use them, is guilty of a wilful deception of the public."

The popular opinion is, that the mechanical engineer is one thoroughly acquainted with machinery, and that, therefore, any one included in this class may write the letters M. E. after his name. Now, all this is radically wrong. A man may sign himself a mechanical engineer. There is no penalty provided by law if he fails to produce a diploma authorizing his use of the title. There should be legislation on this subject.

A man, calling himself a doctor, may administer the wrong medicine, and kill one human being. Forthwith, the law is made strict, and a heavy penalty imposed upon any one practising medicine or using the title M. D. without a diploma. But, when a boiler bursts, or a great railroad accident occurs, the public is so occupied with reading the list of killed and wounded, and censuring the corporation and its employees, that all forget en-

tirely the incompetent man who superintended some point of mechanical construction, and through whose *incompetency* so many lives are lost. The corporation is not blamable for aught more than a mistaken notion of what constitutes a mechanical engineer. The *homicide* wrote M. E. after his name, and the corporation employed him without demanding his diploma. In the first instance I mentioned, one life is lost, and the result is active legislation; in the latter instance, many lives are lost, but the culprit is forgotten, if, indeed, he was ever thought of. Highly consistent, I must say.

But it is urged against any attempt at legislation, as I have said before that men well known in the mechanical field will then be forced to drop their titles. This argument has no force to it, as I can very soon prove. In the first place if we consider twenty men who are honorably practising the profession of engineering, we will find but one or two of the twenty who write M. E. after their names. In the second place, we assume that the legislation is to be wise legislation. Such legislation would provide that "each graduate of a mechanical school shall receive a diploma conferring upon him the degree of M. E. provided that said mechanical school be authorized by law to confer said diploma upon its graduates. Any mechanical school authorized by law to confer diplomas conferring the degree M. E. upon the recipient of such diploma, shall be required, upon satisfactory evidence being given, to give to any applicant a diploma conferring upon him the honorary degree M. E. Said evidence to show that the applicant is practising the profession of mechanical engineering, and is fully competent to take charge of engineering work involving great responsibility. Said applicant is to pay a nominal fee to cover expenses."

This is rough and circumlocutory, but it may serve as a suggestion to those who may some day be required to frame a law on the subject. By means of something like the above we would do away with the bogus M. E.'s who patch rotten boilers, sell badly bagged crown sheets, plug up the safety valve and perform other dangerous tricks too numerous to mention.

My friends, the Alumni, we must have legislation! Legislation at once and active! It is for you to turn the eyes of the legislature upon the subject. It is for you to see to it that the legislature when roused from its lethargy shall pass a wise law. It is for you to

rouse the public to an appreciation of the responsibility of the mechanical profession. Then, and then only, will the end be attained. It is for you to sustain and uphold our profession. Our part is to cheer. In former times, upon mutterings of internecine strife, the consul was corralled to "see to it that the republic receive no hurt." Each Alumnus is a modern consul. It is his place to "see to it that his person receives no hurt."

THE PANACEA.—A LITTLE TRI-FLAT.

Who says America is not a free and independent country? Who says the States and the malaria are not still hold their own? Yes, sir! The flower of dependence still blooms with a fit bloom, despite the Irish and the Dutch fill up everything and spill over beside repeat it, sirs! Liberty still lives and the patent medicine man, that great defender of liberty and union. See how he binds people with one mighty tie. He gives a darned one of them some complaint and, after reading his circulars, they choose selections from the best sightholders verily, they are bound in their commerce by a tie which naught can sever but months arrears for rent. Go, then, ye American, and give thy shekels to the medicine man, that he may dabble in the surf in summer and place his hat on the mantel in winter, and have naught but tear off coupons. We take great pleasure in adding our mite toward the suffering humanity by annexing a belated of the results of the glorious work of the patent medicine man, that all may find deliverance. We have commenced with a few prominent patent medicines and they have very kindly sent us their testimonials from the best channels of the day. We hope that all will find extracts something adapted to their particular case, and that they will be able to thereby.

See what that great and glorious "Sard's Hoopsparilla" is doing for them! We'll quote a little bit from some testimonials:

"Thinking you might like to hear of some benefits derived from using Sard's Hoopsparilla, I am giving everything dead away. I

ng time a sufferer from California big head caused attending Sunday-school too much. I tried nine thousand other remedies with no perceptible effect, but after standing in the shadow of your valuable remedy for seven and three quarter seconds I was entirely cured and am now able to wear the usual sized hat again.

"Very truly,
"CHARLIE GUM."

"I was troubled for some time with my tailor and the mumps. The tailor bothered me more than the mumps, and having heard your remedy highly recommended as a rat poison, I concluded to present my tailor with a bottle. I accordingly did so and it worked like a charm. I haven't been troubled with the tailor since, and the mumps died when the tailor did.

"Yours,
"SHAW THE DUDE."

Now, Shaw, that's a big scheme of yours. We think you ought to get out a patent on that process. We might be tempted to lend you as much as a dollar thirty to push the thing with. Come down and see us, and we'll talk biz and drink beer at your expense.

"About a year ago, my wife was troubled with dyspepsia. She could not keep her food down and so I had to put up an expensive shelf to keep it up. I bought one bottle of your cure and took it home to my wife. She said, 'what elegant furniture polish,' and took half the bottle at once. I took the other half. My wife and I are now confirmed invalids. Send me two bottles for the man that plays the cornet, across the street.

"GEORGE MILLIGAN, the Irish undertaker."

"I take great pleasure in telling what Sard's Hoopsparilla has done for my little boy. Six months ago he began to wear out his shoes and stockings like the blazes. I found out that it was caused by his going into the swamp to hunt mosquitoes, getting his feet wet and, consequently, ruining his feet attire. I purchased a bottle of Sard's Hoopsparilla and treated his feet. I am happy to say they are now waterproof and will probably last my boy until he is married, so up me shimminie gracious they will. I find your valuable compound also very valuable for putting a false m on bad ale.

"SARAH DERMOTT, Captain of the Salvation Army."

Sarah, you have revolutionized the old "an racket" system if you have discovered something to put a foam on bad ale. Saleras was formerly used, but that's no good. Allow us to thank you in the name of all the bumps and bummers in New York City.

We have a few scrawls relating to St. Yarkup's Oil.

"Allow me to turn inside out trying to tell how valuable is St. Yarkup's Oil. We had a picnic last week and one of our number, while stealing apples from a neighboring orchard, fell from a tree and broke his neck in six places. A single application of St. Yarkup's Oil fixed him up all right and he has gained five pounds since the accident. Another of our number got funny and tried to dangle on a rail fence, and he

didn't know how, so he tore his pants from beginning to end. We didn't have sewing materials so we applied St. Yarkup's Oil and his pants were better than new in three minutes. Send me fifteen bottles of your valuable compound to tack on suspender buttons with.

"Truly yours,
"WILLIE CAMPBELL, Jr."

We know Mr. Campbell to be a very reliable personage, and what he says is surely so. No funny business about it.

"St. Yarkup's Oil is a bonanza. I had a ten thousand dollar nose on me, and by four applications it was completely disguised, as well as a corresponding breath. I have found the Oil useful in many directions. I had an old stove quite beyond repair, apparently, but by applying St. Yarkup's Oil I fixed it up and sold it for three Bridge tickets and a pound of tripe. I have found your valuable remedy a very excellent substitute for kerosene and intend to burn it hereafter, even though it does cost six dollars a drop. Send me eight bottles and hang me up for them.

"GEORGE VAN, the big fat man."

"For oofteen years I have been troubled with bunions on the liver. I have spent nearly nine million dollars on doctors, and every doctor I went to managed to grow another bunion for me, so I had in time quite a collection. I saw St. Yarkup's Oil advertised, and bought a bottle. I took the whole bottle at once, as directed, and the contents immediately chawed off the bunions and everything else, too. I shall probably die next week, but send me another bottle before I die, as I like to keep your compound around to take spots off from wood work.

"Very truly, CLINTON MUNYAN."

You see, Clint drank so much cold tea with a stick in it that he aggravated these bunions, and their removal all the more strongly proves the great usefulness of St. Yarkup's Oil. For sale by all newsdealers and milliners. Price six dollars per drop. Ten drops for fifty dollars. Now, no doubt, everyone knows of the great remedy called Neuralgine, and we cannot pass on without showing some of the good work that it is doing.

"I am pleased to be able to state that a sore throat which has persisted in annoying me for several months still annoys me just the same. I have taken three hundred dollars worth of your remedy and have concluded that it wasn't made for sore throat, but for taking stains out of carpets. I now use it for that purpose. I have dyed one set of flannels with it, and am now going to die myself from that three hundred dollars' worth. Don't say a word, but I die in peace. I stole every bit of it, and I ain't losing anything. Send me two bottles for nothing. I want to black my wife's hair.

"OXTA YAZOONTIKE, Chatham St."

Miss Mamie D. Sweet writes:—"I am delighted to say that your valuable remedy has cured me of a serious case of corns on the heart. I also had warts on the intellect, and I found that fifty-six bottles of Neuralgine entirely cured me of both complaints. I had half a bottle left, and have found that Neuralgine makes a very elegant oil for the sewing machine; and I have

cleaned silver very nicely with it. When you get time, I'd like to have you send me ninety-two bottles and a chromo for taking them."

Well, Mamie, you have a nerve, haven't you. We conclude that your nerve is one of those hard and tenacious ones. This subject is also a hard and tenacious one and would last forever had we but the space to continue it; but, as we have not, we will be obliged to discontinue it until three-fourths of the population of the United States ask us to take it up again. But, still, we do like to do anything we can in the great cause, and we can only say, as a final word, that we can recommend to those who wish to die young an earnest participation in the cause of patent medicines, and the sooner you want to die the more you must take. Good day. We'll come down to the jail and see you. T. D. K.

ON CHANGING THE NAME OF OUR INSTITUTE.

The Institute having been founded by Edwin A. Stevens, it was but natural to name it in honor of the founder. As the time passed by the number of students increased, until it soon became evident that either the buildings must be enlarged and new ones erected or the Freshman class be limited to a certain number. As the latter course has been pursued, it has resulted in competitive examinations for admission. It is admitted, now, that the Institute is too crowded, more especially in the lower classes. To erect new buildings, or enlarge the present ones, will require a large sum of money, and it is a well known fact that the Institute is but poorly endowed. What, then, is to be done? President Morton has presented to the Institute a complete work shop, which has proved to be one of the most valuable of departments. But one could hardly expect an outside person, however generous, to donate enough money to erect new buildings to form a part of an institute of learning bearing another man's name. Moreover, the Institute has yet to receive an offer to increase its endowment, and the cause is undoubtedly that above stated. If, however, the name be changed to the New Jersey Institute of Technology, the Institute would receive financial aid much quicker than with its present title. The number of patrons need not be limited to one, but, on the contrary, any number who are willing to aid the progress of science by increasing the Institute's endowment. By this change of name the State

would be directly benefited, and the government, as well as the State, would undoubtedly increase the present endowment. The stages are easily seen.

The electrical department, which is to be one of the finest in the Institute, needs much more room than it has at present. The electrical and physical laboratories being both in the same room, which was formerly occupied by the physical laboratory alone. More room could be given to the lower class, especially in the drawing department, and various new instruments for different laboratories procured, making the department more complete. These are only a few of the many advantages that would result from changing of the name of our Institute to the New Jersey Institute of Technology.

ELEMENTARY BLOW-PIPE ANALYSIS.

III.

The apparatus required for the reaction group III. are: the blow-pipe lamp, the blow-pipe, an alcohol lamp, the platinum tongs, forceps, the platinum wire and a small quantity of hydrochloric and sulphuric acid.

As this is the first use made of the blow-pipe and blow-pipe lamp in these articles will be well to consider the nature of the flames that can be produced by a pair of these instruments. There are two pairs of flames, called the oxidizing flame and the reducing flame, which, in their chemical nature, are identical with the flames obtained from a bunsen burner when the lower air passage is open and closed respectively, thus producing a non-luminous pale blue oxidizing and a luminous yellow reducing flame. The blow-pipe flame differs from the bunsen flame in being smaller, and in being either horizontal or somewhat depressed.

The *oxidizing flame* contains more oxygen than is required to combine with its carbon, it, therefore, is able to impart oxygen to a test piece or to oxidize it. The heat increases the affinity of the test piece for oxygen of the surrounding air, which is constantly renewed by the draught produced by the flame and, therefore, aids oxidation considerably.

This flame is produced by holding the blow-pipe in the flame, from the right hand, so that the opening of the jet is at a one-third of the breadth of the wick, and blowing *forcibly* through the blow-pipe.

The *reducing flame* contains more carbon than oxygen and, therefore, can take away oxygen from the test piece or reduce it. This reducing action, however, is partly neutralized by the same action which has been shown to aid the oxidizing flame. Therefore, in reduction, the test piece must always be well covered by the flame and carefully guarded against contact with the external air.

The reducing flame is produced by holding the opening of the jet a little above the right hand edge of the wick and blowing *gently* through the blow-pipe, so as to elongate the flame a little and lay it over in the required horizontal position.

The blowing should not be done with the lungs, as that produces a variable blast, besides being very tiresome, but rather by inflating the cheeks, so as to form a sort of regulator, while inhaling through the nose and exhausting between the lips. This operation is generally a little discouraging at first, but some practice will soon overcome the difficulties.

To ignite the blow-pipe lamp, light the alcohol lamp first; then, with the blow-pipe, lay the alcohol flame over horizontally so that it will touch the wick of the blow-pipe lamp and ignite it.

Certain metals, whether free or combined with other elements, and also certain acids, have the property of imparting a peculiar and characteristic color to the colorless bunsen or the blow-pipe flame. In order that the color shall be produced, the metal or acid must be made to assume a state of vapor by the application of heat, it is evident that the most volatile compounds such as chlorides and fluorides will be best adapted to show these reactions, as the heat required will be less, while the amount of matter volatilized will be greater than if compounds are used which cannot be changed into vapor so readily.

When the test substance is a salt, moisten the loop of the platinum wire, attach the substance to it and then hold it into the oxidizing flame a little in front of the apex of the interior blue cone. This flame is used because it is nearly colorless and not on account of any chemical effect it may have. These reactions being entirely physical as the substance is simply vaporized and the vapor imparts a color to the flame.

When the test-piece is a hard, brittle substance take a sharp-edged piece in the platinum pointed forceps, hold it so that the flame shall not strike squarely against the piece, but pass

along one corner or edge of it. The wire and forceps should be carefully cleaned previous to each test.

The most important colors observed are yellow, violet, red, green and blue.

The *yellow color* is produced by all sodium salts, it is so strong that if the clean wire be simply rubbed between sweaty fingers a distinct sodium reaction is obtained, owing to the small amount of sodium-chloride in the perspiration. If other colors are present in a sodium flame they are entirely concealed by the latter.

The *violet color* is produced by all potassium salts excepting the phosphate and borate. A minute portion of sodium conceals the violet entirely. To neutralize the effects of the sodium, introduce a piece of dark-blue glass between the flame and the eye, the sodium flame will be invisible while the potassium flame appears as a reddish violet.

When many tests of this kind are to be made with the blow-pipe, it is best to use a pair of spectacles having the left eye-glass transparent while the right one is dark blue, and closing the left eye when the flame is produced. This method leaves the hands at liberty and prevents uncertainty in operating the instruments behind a piece of blue glass.

The *red flame* is produced by lithion, strontian and calcium.

The lithion flame is a beautiful carmine red.

Strontian produces a purple red flame, while the calcium flame is a yellowish red or dark orange.

To obtain these reactions most distinct, the chlorides should be used, or, if the substance is non-volatile, it should be made volatile by the application of some sulphuric or hydrofluoric acid.

The *green flame* is produced by copper oxide, boracic acid, barium and phosphoric acid. Copper oxide alone or combined with some acid, excepting hydrochloric, produces an emerald green flame; 0.1 per cent. of copper in the test-piece shows this reaction very distinctly.

Boracic acid produces a green flame, but some substances containing it must first be moistened with sulphuric acid before showing the reaction.

Barium shows an intense yellowish-green flame, which is best seen with the chloride. Phosphoric acid and substances containing it will show a bluish-green flame; if the latter is not distinct, moisten the substance with sulphuric acid. This reaction can be shown very

nicely with a common match, which is lit and extinguished before all the sulphur is consumed; then, on introducing the end of the match into the flame, the color appears.

The *blue flame* is produced by arsenic, lead, copper-chloride and antimony.

Metallic arsenic, arsenides and arsenious acid, free or combined, produce a light blue flame.

Metallic lead, its oxide, most of the lead salts, and minerals containing lead, give a beautiful blue color to the flame.

Copper chloride imparts an intense azure-blue color to the flame, which, after some time, changes to green from the copper oxide which has been formed. Copper oxide or substances containing copper will show this reaction when moistened with hydrochloric acid.

Metallic antimony and antimony oxide will produce a very pale greenish blue flame.

The very rare elements indium and thallium produce respectively beautiful violet and emerald green flames.

A number of other elements produce unimportant flame colorations, which need not be considered, as there are better blow-pipe reactions for the same elements. O. Pf.

(To be continued).

THE COMMON MEETING GROUND.

In the INDICATOR of November there appeared an article telling us how to make a college paper successful. The writer of that article has pointed out several of the prominent deficiencies, but has not told us what the object of a college paper really is, and what long felt want it is intended to supply. He has supposed it to be self-evident that every student is impressed with the necessity, importance and usefulness of a college paper; but the lukewarmness or, rather, coldness of the students toward the INDICATOR, has shown the sad fact that this want has been neither very long nor very deeply felt among the students of Stevens Institute.

In this article I shall endeavor to show that the college paper is the meeting ground of the students, the alumni, and the professors of a college, concerning subjects of common interest. Only when the students and the alumni are mutually interested in each other, and in their alma mater; and not till the professors feel a personal interest in those whom they have, and have had under their instruction,

will the college paper be a success, and by its success indicate that strong spirit of union which alone makes the college a spiritual power in the land.

These conditions exist in other colleges; why shall they not exist in our own? If you should ever happen to glance into the senior class room you will see on the wall, directly opposite the door, three chairs drawn in very beautiful colors and connected by a board screwed across the legs, and above them the good old motto: "In union there is strength." What a striking picture this is of the general spirit among the students! Two or three of them will become attached to each other, while the rest of the "boys" practically do not exist for them; and yet, what a strength there would be, if students would feel some attachment toward each other as they should, while receiving a common course of instruction! When this is the case, and only then, can we expect the alumni to feel interested in each other and in us.

The students of the various classes have only their class meetings, and discuss only their class interests; we have no college meetings in which to consider our common interests. The college paper supplies this deficiency, and it gives you an opportunity of expressing your opinion more freely and fully than you could do at a meeting. It further provides a means of giving information to your fellow students concerning some technical process you may have witnessed; or if you should have a turn to the poetical or witty, we can always appreciate a recreation from Wood's Mechanics or Rankine's Thermodynamics. Besides, what an excellent opportunity the college paper affords for a student to learn the correct use of his mother tongue in expressing his thoughts—or do you never expect to produce anything that will be worth putting in type?

The alumni can also do very much to elevate or depress the spirit of the student. To judge from appearances, the very fact of the existence of the Stevens Institute seems to have passed from the memories of many, although the alma mater most tenderly remembers all her sons by publishing their names in the catalogues year after year. Some of the alumni have proved bright exceptions, as for the rest, if they do not want to help us because we have had the same course of instruction as they, and if they are aware that we do not know much, at any rate let them not discourage us.

not your heart beat with joy when you hear that a Stevens graduate has actually thought worthy to receive the wages of a day laborer by one of its *alumni*? Do not bless your good stars when you find by another that he could have any of graduates at \$6.00 a week, per

not our professors impressed with the merit of their work, when these are among the results of all their sifting, eliminating and sifting? Some may not be as brilliant as others, but when a man remains until he gets his diploma, it shows that he has at least perseverance; and we all know what perseverance does.

It is sad to be treated indifferently by those in whom we naturally look for help and advice when we enter business. Therefore let us hope that when we leave these classic halls we will go with us a warmer spirit of friendliness toward those who will come after us; and we hope to show this, not alone by letting them hear from us occasionally, but also by giving them practical aid, as circumstances may require.

A feeling of union would also be very increased and much interest would be added to the paper, if all the graduates and alumni would at least notify the INDICATOR of their position or any change in it. Don't wait until you can make it read: "Thomas J. Smith, Ph. D., B. S., '78, has been appointed Professor of Chemistry, at Franklyn College, Macon, Ga.;" or "John F. Smith, M. E., '81, is superintendent of the X, Y and Z Works of the New York, Lake Erie and Western R.R."

The paper reads very well; but if you do wait long enough, the column of personals, interesting to all, will always be very thin. You will hear much about your classmates, and you will, in the meantime forget that you are a graduate. Be assured that our editor is intelligent enough to put in "James West, M. E., Engineer, with the Murray Boiler Co., New York," if you want him to. Although this looks humiliating when it is surrounded by the names of superintendents and professors, it is no bad thing when a number of other graduates are also bold enough to acknowledge their position. They are beginning at the foot of the ladder, and we all must.

Communications from our esteemed professors have been few and far between; and yet, at all our meetings in the INDICATOR we have heard without an occasional word from them?

What an additional interest these pages would have, and what a strong bond of union it would be to the student and alumni, to hear from those whom we *all* know and to whom we *all* are indebted for a great portion of our learning and training. They, perhaps, are better able to judge us than any one else, and knowing that any communication from them would be interesting, they will surely honor the INDICATOR with their occasional presence, and thereby help to make the paper what it should be—the common meeting ground of all united in the name of Stevens Institute.

JERSEYITE.

OIL CANS AND CANTS.

Through the kindness of an interested alumnus, we are enabled to publish the following, from *Mechanics*:

A clever correspondent, who has evidently read with more amusement than profit a great deal of what in current literature passes for practical information of value to practical men, sends us the following treatise on the use and construction of oil cans, based upon alleged practical experience therewith:

I now wish to give to mechanics generally the results of many years' practical experience in workshop oil cans.

A dirty workman always has a dirty oil can, or, in other words, a dirty oil can always has a dirty workman.

The proper shape for a machinist's oil can is a matter requiring the serious consideration of the practical engineer.

Fig. 1 shows the form of can I have arrived at after a great deal of experiment. A is the spout shown in section and having a conical taper hole, B. As to the proper shape of the bead at the end of this spout, many of our most eminent engineers entirely disagree in their practice. I have always adopted the plan, according to the true principles of conic sections, of making the taper of the bore 3.76-328 inches to the foot, or 7.52656 inches for 2 feet. Some workmen do not like this taper, but I have found it the most desirable on large work, because if the bottom C of the can is pressed hard enough, the oil—assuming the given condition that the can is full—will be ejected with sufficient force to travel in a straight line; hence there will be no danger of the oil missing the hole to be oiled when the spout of the can cannot reach the hole to be

oiled. This is shown in Fig. 2, in which A is a casting of cast iron of any suitable mixture of metal, molded in sand or loam, but must not be chilled. A, Fig. 2, is provided with a bore, B, whose end faces are C and D. E is the oil hole, with a countersink at F, the recess at G being too small to get the can in.

The method I have found best in practice is the following: The body of the can H is filled with oil from some other can or vessel.

On the P. D. Q. R.R., they have a modern improvement embracing a compound system of hollow cones soldered at A in Fig. 3. These are made of imported IX sheet tin, which comes in sheets 8x14 inches, packed in wooden boxes which are nailed up with wire nails, so that the tin cannot come out. The gauge used by the P. D. Q. R.R. Co. is terne plate under the Birmingham wire gauge or charcoal tin in the American standard, the thickness being entirely independent of the gauge and the gauge independent of the thickness, and both independent of the size of the can.

Having selected these elements, the lower cone X is first rolled into shape and then tinned at the seam with a soldering iron made of copper, Fig. 4, in which H is the handle, usually of hickory wood, receiving the iron stem K in a taper hole which is surrounded by the iron ferrule J. L is a piece of copper which I have found it best in my practice to call the iron. The iron L and end of stem K are drilled with a twist drill of No. 10 caliber, and a pin or rivet M is first passed through K and then through L; it is then laid on an iron block and riveted with the hammer shown in Fig. 5, in which Z is the head and Y the handle. Now L being riveted to K, the two cannot fall apart; hence the workman is not liable to burn his fingers with the iron. With this tool the lower section of the compound cones of Fig. 3 is soldered along the seam, as I said before.

The upper compound cone W is soldered in a similar manner, and is provided with a ring, V, by means of which it can be hung up in any suitable place near the oil tank, or it may be attached by a string to the oil

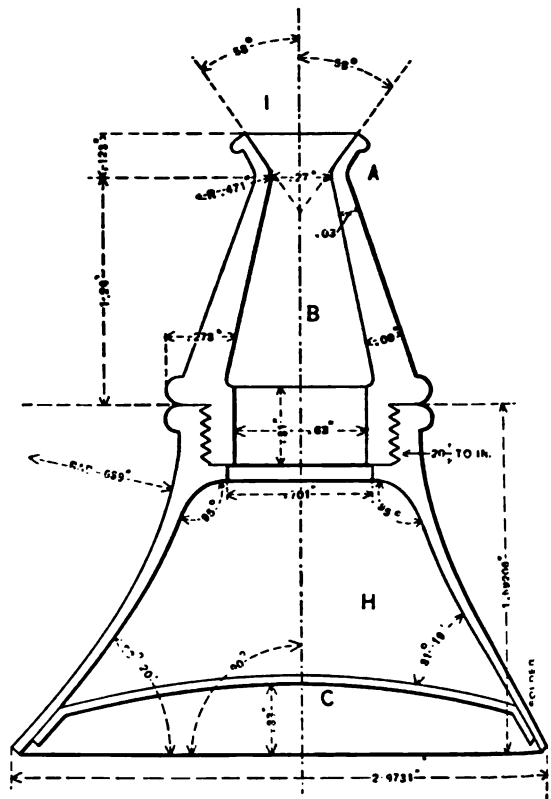


FIG. 1.

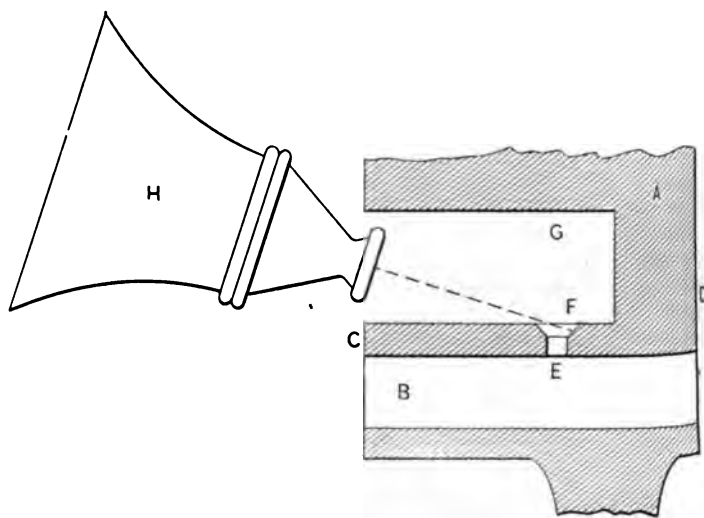


FIG. 2.

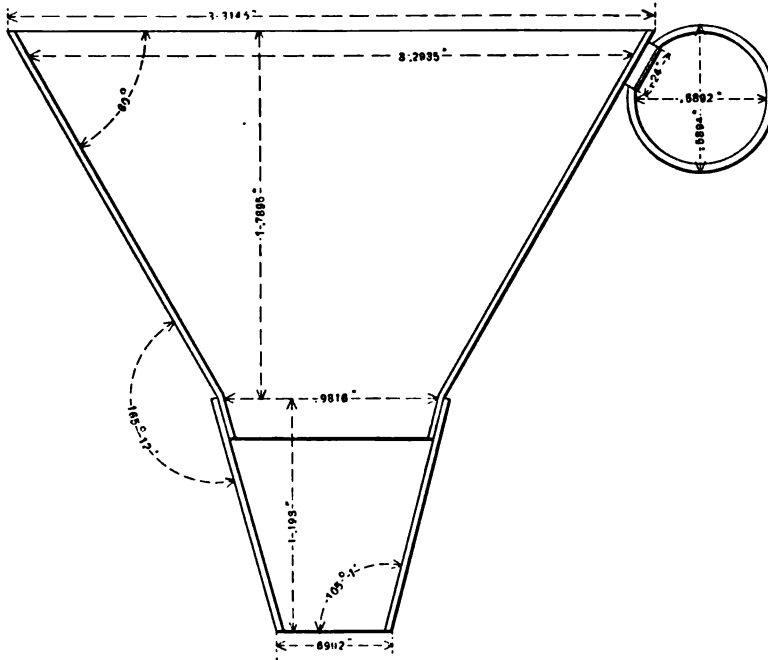


FIG. 3.

the best string for this is No. 14 (music age) copper wire.

Use of this instrument is as follows: Cut out B of can, in Fig. 1, has, at the bottom, a screw thread by means of which it is attached to the bottom part H. In my practice I have made this a right hand screw. By turning the spout B, it comes off, and the upper half of the compound cone of Fig. 3 is

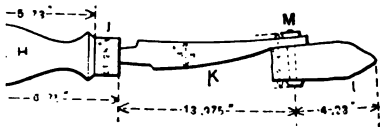


FIG. 4.

placed in H. The upper half of this cone is positioned vertically beneath the faucet on the barrel. The faucet is turned so that the plug falls in line with the barrel, and oil passes through and falls into the lower section of the compound cone, and through the lower section into the can.

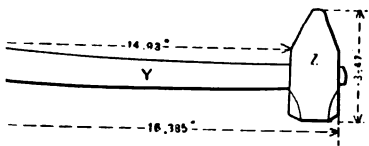


FIG. 5.

This saves a great deal of time in filling oil cans and is a valuable "shop wink," especially where there is only one oil can for each department. In my practice I have found it much easier to place the oil can under the barrel than to hold the barrel over the oil can.

A JOKE (?).

They are making a great fuss about an engineer on a railroad in Germany who has run on the road 49 years and never had an accident. We don't see anything wonderful about it. The engineer on a German railroad, we believe, always walks ahead of his train and shoves everything off the track, while his wife shoos the train along after him. Still, we can see how an accident might happen. The engineer might grow weary and climb on the train and go to sleep, and so get into the station ahead of time, and run the risk of catching a severe cold while waiting for the *esteam-agewagonhausbundeirassmeister* (German for station agent) to open the *zweitrackagesteam wagonausgerornudhausmitswanzigdoors* (round house).—*Bob. Burdette, in Mech. Engineer.*

The Stevens Indicator.

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Exchanges, contributions, subscriptions, advertisements and all other communications by mail, should be addressed to THE STEVENS INDICATOR, Stevens Institute, Hoboken, N. J.

NO apologize for the late appearance of the January INDICATOR would be futile, inasmuch as our only excuse, if it may be called by that name, is—the excessive length of our winter vacation. Instead of making good use of our spare hours, by preparing our manuscripts for January, procrastination, as usual, stole away our time. Other delays were not lacking, so that the Board can congratulate itself that the paper is published at all. We might also mention, *en passant*, that the support of the students, in the shape of contributions, was again equal to almost nothing. We hope to do better next month, and expect that the literary men of the Institute will do the same.

THE contribution, entitled “The Common Meeting Ground,” certainly deserves perusal, and contains many points meriting the attention of all interested in the welfare of the INDICATOR and of the students. The appeal made to the Alumni of our Institute is, undoubtedly, a timely one, and should be taken to heart by all. We have been receiving many excellent suggestions from graduates, but as yet we have not been able to act upon

them, for lack of active support from the Alumni at large. Then the paper would become one of more practical value, not only to the students, but also to the graduates, thus making the INDICATOR a medium of communication between the sons of our *alma mater*. If the Alumni Association would take some action upon these suggestions, the desired feeling of union and interest between the students and graduates of the Institute would be greatly advanced.

WE have begun the practice of, placing upon the library table our exchanges, in order that the students may have an opportunity to learn what is taking place at other colleges and to compare the INDICATOR with other journals. Whether this venture is to succeed, has not as yet been proved. At present if a student sees a neat looking paper, he puts it in his pocket to “read during math,” or whenever it is most convenient for him. As a consequence, one runs across, in most out-of-the-way places, recent exchanges bearing the INDICATOR stamp. Some of these have been known to travel as far as the bakery on Washington Street. This is without question taking unfair advantage of a privilege. The papers are put in the library for general use, not for two or three students. It may reasonably be asked why—if students are to assume exchanges, as soon as they fall into their hands, to be private property—should not the stockholders of the I. P. Co. divide the copies among themselves? Having said this much, we will continue the experiment a little further, and we may as well state here, that if the scheme works well, our choicest exchanges will find their way to the library table.

WE feel constrained to say that Professor Wall has taken a most progressive step in the conducting of the Literature course. Such a step is in full keeping with the strides made in the past year by real education *versus* “machine education.” We are sure that the

has paid most kind attention to the and suggestions which have been the students since the question agitated. Those who, two years and the subject under the old *regime*, now recognize what they then conceived their worst enemy. It is evident, on the face of it, that Prof. Wall believes that we have brains and judgment, and that the students in general complain of a lack of them. There must be sound reasons for such a situation. This in itself, however, does not justify any action on the part of the professor to change such a course; but they have shown that they are worthy of the attention paid to them, in that they have done what they did want, while crying out what they did not want. Without saying any more, we hereby express our appreciation to Professor Wall.

COMMUNICATION.

Editors of the Indicator :

we wish to call attention to the condition of the machines, etc., in Prof. Wood's room. The contents of the room are practically left to the care of themselves judging from their

carelessness over the cases of test pieces that are treated many cases, broken and the test pieces themselves considerably disarranged, the governor, especially, is in such a state as betokens gross carelessness on the part of some and negligence of others. It is thought certainly to be responsible for the condition of this machine, otherwise it will sooner or later be lost.

The class of '87 first began machine work when they were instructed to leave the question in the condition in which they found it, *i. e.*, in good order and to *take care of it from the room*. During the last term, the Junior class were engaged in the sketches of the Gardner governor; they went down to complete his machine one day, and he found the governor taken to pieces and the *valve missing*, and it could not be found at all that day. It is thought that some blooming idiot had run up into the drawing room, locked it up, and had left the building.

When the machine was seen last, Dec. 16th, the valve was not where it belongs but on the shelf alongside of the governor together with several other small pieces. It is hoped that something will be done to put a stop to such carelessness.

"JUNIOR."



The faculty of the Stevens Institute, in their endeavor to further the interests of the physical as well as the mental capabilities of the students, intrusted to their charge, have, with commendable foresight, divided the college year into three parts, commonly known as the first, second and third terms. Naturally, one would suppose each term to represent one-third of the collegiate year, but not so, for when it came to dividing the year into three equal parts, a serious difficulty arose, various opinions were offered and as promptly objected to. One member stated that "limits" was an absurd term and could not be used by any respecter of truth and right; another would have substituted infinity, and, as the discussion progressed, matters grew worse, and as a compromise, the question was left to the caprice of the "inconstant moon." Hence it is that the second term this year is longer than it will be for some 50 odd years.

Another important reason for taking the moon as a standard was to divide the athletic year into such intervals as to best promote the interests of the students in the sporting world. For instance, the first term is set aside for football and referee (this is a new departure and is recognized at Stevens as an established sport; was played with great success last fall), and all the exciting circumstances connected with the two games. The second term, was originally intended (and the idea is faithfully carried out) as a period of rest for our athletes; a time for binding up wounds, mending fractured skulls, sprained ankles, broken ribs, etc., all the natural outcome of foot-ball as played in the twenty-seventh story (back room) of the modern *news(?)*-paper shop. Then this term is well occupied with the healing of

wounds occasioned by the game "Referee." The fellow who blighted our hopes in the Fall, is now cussed more satisfactorily and effectively, than during the excitement of the game. Not a stone is left unturned to make his life miserable, and if both stones and vocabulary cease to furnish missiles for his destruction—castings (ten cents per pound), free of sand holes, from Hawkridge's, continue the good work.

This term was originally set apart for indoor physical culture, but since the apparatus of our ex-gymnasium was removed *temporarily* to the garret of the Institute, the association has recommended that members stand on the bureau in their 6x8 ft. rooms (the regular gauge for Hoboken quarters), and swing a pair of blacking brushes for a half hour each day.

The association has a species of promissory note for a new gymnasium, but the note declines to mature.

Skating is encouraged by the association and as there are several good stretches of ice about Hoboken, the "boys" spend a large part of their leisure moments sliding. Hoboken supports a rink, whose advantage over the meadows consists in the possession of two gasoline lamps. A *double* supply of lights, is indicative of a *Carnival*!

The third term represents the second active period of the year, and those who were not stuck by the faculty, buy "sticks" of their own and work hard for a position on the lacrosse team. The battery for the baseball nine, after a winter's practice (?) at Hexamer's, comes forth and surprises everybody. The chronic growler turns anew his strings of discord and croaks with the ambition to drown the voice of his weaker brother, the meadow frog. The season closes and then comes a void, when again the cycle of victories and "Referee" absorb the attention of our little world.



How are you?

How did you get through with your exams?

Have you learned to write it 1886 time?

How many silk handkerchiefs and pair of slippers did you get at Christmas?

The Soph. who talks about "choleric" is sure to get mad if the boys laugh.

Ditto, in Physics—"Why, of course, we have a vacuum in the globe by *blowing it in*."

"Three beakers—10, 12 and 15c; 50c." is the way it reads on the labor price list.

The Soph. who, while fooling, rushed the stairs and into Prof. Wall's arms is *resigned* to his fate.

"I had a box of colored chalk here, but somebody has gone and *collared* it." Tell anybody where you saw this.

Soph. in Chemistry—"I'm not sure, professor but I think that, er, *silico* has a peculiar odor—something like rotten egg."

It seems to be now generally conceded the Preparatory department is the most important part of the Institute. Well, I so.

The Sophomore class, in their course of literature, have taken up the study of Shakespeare. Three of his best works are studied.

Prof. Geyer is amusing the Senior class by exhibiting a little glass man, lying on to wire, and swimming with all his might against a strong current of electricity.

He mumbled something of this sort:

"I wish that Prof. was in perdition."

He sadly gazed on his report,

I judged he must have a condition.

After all, there is not much difference between the wily Sophomore and the innocent Prep. The one gambles while the other bolts about the halls of the Institute.

Prof: "Good morning. Are you all here?"

Class: "Yes, sir; all here."

Alas, sighed one, as he thought of those who were dropped. How soon we are forgotten!

Will the student, who borrowed a box of curves from Wynkoop, '88, last term, please return the same, and oblige the owner. The curve has a W scratched on it, and the W is on the inside of the box.

"Don't you see if I should go off to and give this body a twist by means of which, it would act so and so."
 It: "Yes, sir, I see; but no right man would go off to infinity to twist

the Sophs. got a Waterbury watch for Christmas present. He goes into the shop twice a day and winds his "stem" by gripping it in a chuck in one of his clothes and throwing the belt on the floor.

ould advise the Freshmen to stop fooling "Donald." To be sure, Stevens is a institution; but, if a half dozen of them should get bitten, the college could not give you all a free passage to France, in the interest of science.

freshman who left a letter addressed "Ellie," on a seat in mathematics. It will call at our sanctum within five days may save his letter and his reputation. If not called for within five days, the letter will be posted on the bulletin

students that send us communications "being," examinations, etc., will find subjects treated at length in a little book, published by the New York *Evening Post*. It contains the views of professors from most of the colleges of this country, and is really a good book.

number of small black objects were seen floating in the river off the "Elysian Fields." They were supposed to be diaries discarded by the disgusted inhabitants of the cities and towns up the river, who had set out with the determination of making a strict account of their doings during

the Sophs. were sitting for their picture at the Institute steps the other day, a large bag of sawdust, descended from the floor above, coursing over the backs of their necks and coming out of their cuffs. It was a cold day, and before they could remove themselves they were frozen fast in their positions. Their unfortunate classmates succeeded, however, in lighting a fire around them, and in time they were free from the gaze of this cold, unfeeling world.

An upper class man and a Freshman have put their heads together, and the result is an invention that will, no doubt, be universally adopted by the students. It consists of a wire which is attached to the register and stretched across the floor close to the bed side. The first one to awake in the morning seizes the wire and opens the register; then he jumps out and shuts down the window. By the time they have finished their breakfast, the room begins to get warm, and is quite comfortable when they return for lunch. It is said to work like a charm. As the patent is applied for, a full description of the invention, accompanied by numerous wood cuts, will, probably, soon appear in the *Scientific American*.

PERSONALS.

'76.

PROF. A. W. STAHL, at Purdue University, has recently, in conjunction with Prof. A. F. Woods, of the University of Illinois, brought out a treatise on *Elementary Mechanism*. Van Nostrand being the publisher.

'81.

ALBERT SPIESS has returned to the staff of the *Iron Age*, and will take charge of the mechanical department, and all engineering matters connected with it. *Mechanics* with which he was formerly connected having been sold.

'83

MORGAN BROOKS, in the *American Engineer*, for Oct. 22d, gives a critical review of a recently published book on "The Gas Engine," by Wm. Macgregor, in which he tersely proves beyond a doubt that this author plagiarized to an astonishing extent from German and French works on the same subject.

'84.

GEORGE F. SANDT is with the Edison Electric Light Company, in New York City.

WM. H. PIERCE, JR., has in hand the making of the general outline drawings for the various classes of locomotives on the Philadelphia, Wilmington and Baltimore R.R.

E. B. RENWICK has W. H. Bristol's former position as Instructor in Mechanics and Drawing, Workingmen's Institute, New York City.

WILLARD S. TUTTLE has left Bridgeton, N. Y., and entered his father's firm, Tuttle & Bailey, New York. He is now stationed at their factory in Brooklyn.

'85.

W. J. BROADMEADOW is associated with his father in the canning business at Red Bank, N. J.

WM. S. CORWIN has entered business on his own account, in the line of Electric Bells, Gas Lighting Apparatus, etc., at Newark, N. J.

E. DREYSPRING is with the New York Plough Co., at Yonkers.

WM. N. STEVENS has accepted a position with the Worthington Pump Works, Brooklyn.

THOS. G. SMITH is in the shops of the P. C. & St. L. Ry., at Indianapolis, Ind.



The *Mechanical Engineer*, for November 28, contains a full account, with drawings, of the United States twin-screw cruiser "Chicago." This number has been advertised for some time past, and is well worth preserving for reference.

We have before us the *Swarthmore Phoenix*. It seems like an old friend, although we can find no record of its appearance before upon our study table. The literary matter is well selected, and the typography of the whole is good. We are glad that hereafter we may count the *Phoenix* among our exchanges.

We have before us the first number of the *Pennsylvanian*, from the University of Pennsylvania. The *University Magazine* has disappeared, and this new weekly has taken its place. While such a change from a monthly to a weekly necessarily cuts down the amount of literary matter, we hope that our friend, the *Pennsylvanian*, will not abandon this department entirely.

The exchange editor of the *Sibyl* has been reading Thackeray. She writes; and the sarcasm flows gently from her pen, like the ideas from the mind of the verdant freshman. We are amazed at our own ignorance. We admit that by a mistake we made Professor Thurston

go to *Utica*; yet we do not lay the blame upon the printer. At any rate, the *Sibyl* may take our word for it, that we will see to our geography hereafter, and thus avoid such a mistake—a mistake which, if we had "cousins" of the opposite sex at Ithaca, would never have been made.

Just as we go to press we have received *Van Nostrand's* for January. This number contains a paper taken from the *Philosophical Magazine* and entitled "The Luminiferous Ether." In this article Professor De Volson Wood, after quoting various authorities, says: "We propose to treat the æther as if it conformed to the Kinetic theory of gases, and determine its several properties on the conditions that it shall transmit a wave with the velocity of 186,300 miles per second, and also transmit 133 foot-pounds of energy per second per square foot. This is equivalent to considering it as gaseous in its nature, and at once compels us to consider it as molecular; and, indeed, it is difficult to conceive of a medium transmitting light and energy without being molecular."



CROSS PURPOSES.

We have paused to watch the quiver
Of faint moonbeams on the river
By the gate.

We can hear something calling,
And a heavy dew is falling,
Yet we wait.

It is, no doubt, very silly
To stay out in all this chilly
Evening mist;
Still I linger, hesitating,
For her lips are plainly waiting
To be kissed.

So I stoop to take possession
Of the coveted concession
On the spot;
But she draws back with discreetness,
Saying, with tormenting sweetness,
"I guess not."

Her whole manner is provoking;
"Oh, well, I was only joking."
I reply:
She looks penitently pretty,
As she answers: "What a pity;
So was I!"

—Harvard Lamp

* THE *

Stevens Indicator

Vol. 3.

* February, 1886. *

No. 2.

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T H E

Stevens Indicator.

Vol. 3.

HOBOKEN, N. J., FEBRUARY, 1886.

No. 2.

THE BARK OF MEMORY.

I stood by the shores of the beautiful sea,
And mused o'er the wonderful deep;
A feeling of awe and of mystery
My heart in suspense did keep.

In the west I saw the orb of light
Depart in a cloudless sky;
In the east appeared the shroud of night,
As the lovely day must die.

And all was calm as in slumber bound;
While on the lonely strand
The waves were beating with gentle sound,
Like songs from a better land.

In the distance I saw a gallant bark
Come bearing down to me;
Her full sails were a silvery white.
As she dashed o'er the rolling sea.

Her hull was wreathed with garlands gay,
Her masts were bright as gold;
The sailors sang a mirthful lay,
Whose tune was quaint and old.

She neared, and I looked in an eager way,
And they beheld me on the shore;
I saw all the friends of my boyhood's day,
While they greeted me as of yore.

Her course she changed again to the sea,
Her bell was tolling a mystic chime;
I knew then—the bark of memory,
Was sailing by o'er the ocean of time.

—JERSEYITE.

THE INDICATOR.

A short history of our periodical, the **INDICATOR**, together with an account of its management past and present, would not be out of place here at the present time, when it is just beginning its third volume.

More especially for the benefit of those members of '89, who are not familiar with its past record, do we present this account, in order that, being aware of the difficulties which had to be overcome in starting and maintaining the paper, they may perhaps feel a little more interest in its further maintenance.

About two years ago, *i. e.*, just before the Christmas holidays of 1883, a number of the students thought it would be an excellent scheme to start a college paper. Accordingly, a meeting of the whole college was called, and the plan talked over. The idea was considered to be a good one, and so volume one of the **INDICATOR** began with January, 1884. The management of the paper was intrusted to a board of editors elected by the respective classes; two from each of the Senior, Junior, and Sophomore classes, the Freshmen having only one representative. All the students were invited to contribute to its columns. But the principal difficulty was in obtaining articles for publication, for students in a college course like ours have very little time to devote to literary pursuits. This fact was soon proved, and consequently the hard work rested rather heavily upon the editors.

We quote the following from an editorial which appeared in the first number of the **INDICATOR**: "We know that a paper like this requires an expenditure of time and labor which we can ill afford to give. Our legitimate college duties, already arduous, are constantly growing from year to year, and leave but little time for outside issues of this kind; yet we are willing to devote to it much time, which would otherwise be devoted to recreation, trusting that all who can will bear with us in the work." We see from this that the editors seemed to half expect that most of the work would fall upon them; and so indeed it turned out, that not only most of the work, but all of it, had to be done by the editors. The students, although evincing a great interest in the prompt appearance of the paper, yet, when asked to contribute articles, always thought that they could not possibly find time to write one. This was the case even with the Freshmen, who always seem to have so much leisure. But, notwithstanding all these difficulties, the **INDICATOR** fought her way bravely onward, and kept improving with each issue. Frequently during the year, in fact, in almost every number, appeals were made to the students for help, but none

seemed to be forthcoming, and at the end of the year, after issuing the last number of Vol. I., the board of editors resigned in a body.

Then it was that the students began to realize how affairs stood, well knowing that if the paper did not succeed, it might be years before another attempt would be made. Accordingly, a meeting of all the students was called, and they showed that their interest was not all gone by deciding that the paper should not be discontinued, and by finding means whereby the work could still be carried on.

The plan adopted was that of the formation of a stock company, consisting of fifteen members, and in the hands of this company the paper was placed. This plan has been found to work much better than the former one; but still there is a lack of co-operation on the part of the remaining students who are not members of the company, these apparently thinking that all responsibility has been removed from their shoulders, and that all they have to do is to read. But this is a very wrong impression, for every student should feel interested to have the paper succeed, and should therefore do whatever he is able to do for its support.

Perhaps a student may not have time to write for himself; but why not get an article once in a while from some friend of a literary turn of mind outside the college? The same remark applies to sketches as well as to articles.

One of the chief attractions of the INDICATOR at present is the series of articles on the subject of "Elementary Blow-pipe Analysis." More matter of this kind would be very acceptable, and would fulfil one of the purposes for which the paper is maintained, viz., instruction.

"Well," you may say, "what conclusion may be drawn from what has just been said?" Why, just this: if, notwithstanding the difficulties which have beset its path, the INDICATOR has overcome them, and arrived at its present condition, which is by no means bad, how very much more attractive, interesting, and instructive a journal it might become if it had the co-operation and assistance of even one half of the students, which, we are sorry to say, it has not at present, and we can only hope that, as time goes on, more and more interest will spring up among the students, and that they will do their share of the work as well as reap their share of the benefits.

ELEMENTARY BLOW-PIPE ANALYSIS.

IV.

In group IV, the metals which produce an incrustation on charcoal are considered. It is certainly the most interesting of all the groups, not only from the number of elements which it includes, but also from the variety of chemical combinations that may be produced in it. By means of the incrustation on charcoal, the common metals—arsenic, antimony, lead, bismuth, cadmium, zinc, tin and silver—may be detected. In some cases, a metallic bead is also produced from the test piece, when it contains either antimony, lead, bismuth, tin or silver. The characteristics of these beads will be given in another group, and only the incrustations considered in this place.

The apparatus needed for this group are: the blow-pipe and alcohol lamps, the blow-pipe and several pieces of charcoal. Special attention should be given to the latter, which must be of fine grained pine wood, about four inches long, one wide and one thick, and only the two sides which show the grain in parallel lines should be used, and kept smooth by means of a fine file or emery paper. A few samples of the charcoal may be seen in one of the mineral cases in the library.

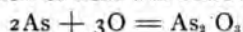
When the charcoal is to be used, cut a small shallow cavity, about $\frac{1}{4}$ inch from one end, for receiving the test piece, and after the latter has been placed in position, hold the charcoal at an angle of about twenty degrees to the horizontal, so that the flame will touch the test piece, which is at the lower end.

According to the nature of the substance, the uncombined metal, the oxide, sulphate, carbonate or chloride may be produced. In some special cases, a reagent of equal parts of potassium-iodide and sulphur is used, and also a dilute solution of cobalt nitrate, which produce characteristic compounds with some metals.

The properties of the incrustations by which the corresponding metal is recognized, consist in odor, color, volatility and the color of the reverberated flame produced by the compound. The reverberated flame is obtained by holding the deposit in, and at right angles to the flame, so that the latter is reverberated or thrown back from the charcoal and colored by the vapors of the deposit, the colors, of course, being the same as those obtained in group III by the same elements.

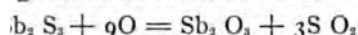
color of the deposit is best seen at the point nearest to the test piece, as the deposit is thickest at that place, while the more distant part assumes a bluish tinge from the charcoal.

An oxidizing flame is invariably used, as the deposits are mainly oxides, though, in analysis, some cases occur, with zinc ores, where an alternating oxidizing and reducing flame produces the best results. *Antimony*, as a metal, or in combination, will produce a white deposit, which is very volatile, therefore, settles only on the coolest part of the charcoal, from which the slightest increase of heat will remove it.



If the test piece is an oxide of arsenic, it is simply volatilized and redeposited, and does not produce the peculiar odor of arsenic when mixed with other compounds.

Antimony and its compounds produce a deposit, less volatile than that of arsenic—therefore, nearer the test piece. By using the reverberated flame to the deposit, a green flame coloration is obtained.



A small portion of antimony sulphate may be produced in this case.

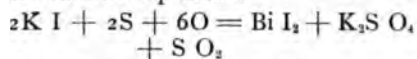
Antimony and its compounds produce a deposit, near the test piece, and which has a blue color when hot, but becomes white on cooling and can be volatilized at a dull red heat. The deposit is generally the oxide, but it contains traces of carbonate, sulphate or sulphide, depending on the nature of the test substance. When sulphide of lead is used, traces of antimony sulphate are invariably produced.



The reverberated flame shows the blue color of lead.

Antimony and its compounds produce an orange colored deposit, when hot, which turns to lemon yellow on cooling; in other respects, it is similar to lead.

A mixture, consisting of equal parts of antimony—iodide and sulphur, is mixed with an equal volume of the test substance, and a deposit is formed which is lemon yellow if the test substance contains lead, and brick red if bismuth is present.



A white deposit produced by potassium iodide is inconsiderable.

Cadmium produces a reddish brown deposit, which has a variegated border, and cannot be mistaken for any other.

Zinc produces a white involatile deposit of zinc oxide, very near the test substance. When treated with the reverberating flame, a white glow is seen, but the deposit cannot be driven off by the greatest heat.

Tin produces a deposit very similar to that given by zinc, but when it is treated with cobalt nitrate, a bluish green color is produced, thus distinguishing the two deposits.

Silver, after long continued blowing, produces a slight dark brown incrustation of silver oxide on the charcoal. The deposit is only obtained when a large amount of silver is contained in the test piece. If, however, any white deposit of antimony, lead, zinc or tin is first produced and then overlaid by a silver deposit, a very delicate rose tint will appear, and less than one-half of one per cent. of silver may be detected in the test substance.

Some alkali salts as sodium and potassium sulphate produce a white volatile deposit, which may be distinguished by the color of the reverberated flame. O. PF.

(To be continued.)

ABOUT THE NAME OF OUR INSTITUTE.

The article about changing the name of our Institute is one which ought to naturally create some discussion. It is only too true that we are crowded for accommodation and that a liberal endowment would be most acceptable. Our faculty even recognize this for they mention the endowment scholarships in the annual catalogue, and by this means hope to awaken outside interest in the Institute which ought to benefit us financially. It hardly seems to me that because our name is Stevens we do not receive outside aid. Other colleges which bear the name of the founders, or some one largely interested in it, such as Yale, Harvard, Cornell, Johns Hopkins, Vanderbilt University, in Tennessee, receive annually endowments such as we desire. It can hardly be that our name is at fault. Cornell University, receives or has received substantial money grants from New York State, while it is named after a private person. Why could not Stevens receive support from the State of New Jersey likewise. The people of New Jersey take great pride in their common school system and I think, if interest

enough could be awakened among the people, they would respond with a cheerful gift or grant. The question then is to awaken interest. This is the rub. We cannot hope outsiders will do it, hence it must be done by our graduates. But then I have my doubts as to this, for generally speaking, it seems the most difficult thing to awaken interest concerning matters in college life. Take our college organ, the *INDICATOR*, for example; if it were not for the few students who have banded themselves together as a publishing company it would have died long since. But this is a digression, and to return once more to our subject: I believe it is shown that our name is no hindrance to endowments. What we want is genuine, sympathetic outside interest. Let us show to the world we are useful and honorable members of society; that we are capable, honest and efficient workers and we will soon get friends. One disadvantage to us is that we are young yet, hence we cannot expect much. We must grow naturally—a forced growth is without strength. Another point, although it has not weight, is that Stevens æsthetically considered is much preferable to New Jersey. In conclusion, I would say to those who have thoughts of endowment, not to let our name stand between as a drawback. It shows a narrow and selfish spirit which is not found in the liberal minded people who endow colleges with the honest purpose of advancing higher education.

“STEVENS.”

SOME FACTS ABOUT THE RECENT CLASSES AT STEVENS.

It is always interesting for the undergraduates of an institution to look back over the classes that have gone before them, and wonder how they got through examinations, and whether many of the members of the different classes concluded not to go on with their college course, after having received their reports with one word of eight letters, beginning with *d*, attached to it.

Looking over the old catalogues, we find that the class of 1884 entered with about sixty members. They labored, as the Freshmen do now, with trigonometry and co-ordinate, with the French verb and the laws of Newton, and, as the next year's roll call proves, succumbed to one or more of the former. As Sophomores, they numbered 47; and they evidently were more successful as Sophs than they were as Freshies, for, as they entered their Junior

year, there were 42 on hand to answer to their names. As Seniors, they were still 42, and with that number they graduated; and now they are out in the world making their mark among men of their profession.

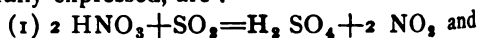
When '84 had reached its second year, a new class, numbering 53, came in. This class of '85 seems to have had some difficulty, as is peculiar to Freshmen, for in their second year there were but 43. As before, the Sophomore year was not as bad as the Freshman, or rather, the men were better than they had been, for '85 had 42 Juniors. But the Junior year was and is a hard one, and only 36 Seniors were on hand to graduate.

Perhaps '86 will excuse us if we presume that they have graduated. They began college life with 48, and sad was the havoc made upon them, for there were 37 Sophs to take up Calculus and Descriptive Geometry. But they braced up and went into the Junior year with 36 men who were bound to get through, and 33 of them stuck to their resolution and became Seniors, and will probably graduate next June, if all goes well.

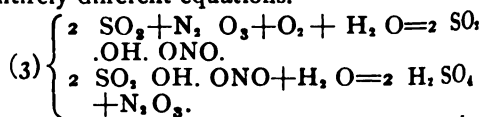
The classes of '87, '88 and '89 will have to wait, particularly '89, to wage some more warfare before having their roll call made up. For the present they must be content with what they have gained or lost.

THE FORMATION OF SULPHURIC ACID.

The equations, by which the formation of sulphuric acid in the leaden chambers is generally expressed, are:



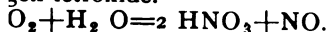
Lunge, a German chemist, proposes a change, and represents the reaction by two entirely different equations.



The difference lies in this, that in the first two equations it is the nitrogen dioxide, and in the third the nitrogen trioxide, which carries over the oxygen to the sulphurous acid, and thus causes the formation of sulphuric acid. In Lunge's formula, the formation of $\text{SO}_3 \cdot \text{OH} \cdot \text{ONO}$ (nitrogen-tetroxide-hydrosulphate), which, in the form of crystals, is called the "crystals of the leaden chamber," is one of the main actions taking place. In the old

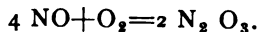
However, the formation of this compound is regarded as secondary, and, it is believed, ought not to take place. It follows that the quantity of nitric acid is large.

(1) supposes that, after the first of sulphuric acid has been formed, nitric acid results from the action of water on nitrogen tetroxide.



which is one of the products of nitrogen in contact with the oxygen of the atmosphere again into NO_2 , which then, with water, causes the formation of a new nitric acid.

(2) it is also the nitrogen dioxide acts as a carrier of oxygen from the sulphurous acid, the nitrogen trioxide produced by the oxidation of the

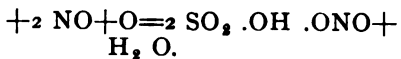


Armstrong came to his conclusion through facts observed, while trying to determine the composition of nitrogen trioxide. Armstrong and Cundall were right in saying that nitrogen trioxide does not exist in a stable state. Armstrong thought that in which the latter experimenters had consisted of a mixture of the dioxide and tetroxide of nitrogen. Lunge showed that the nitric acid they used was strong. He experimented on the combination of NO and free oxygen, and the following results:

1 dry NO is brought into contact with O_2 , NO_2 is almost exclusively

however, NO is in excess, NO_2 is produced in a large quantity of N_2O_3 . The presence of H_2O and excess of O_2 , produces NO_2 .

and O_2 acting upon each other in the presence of strong H_2SO_4 , form neither NO_2 nor NO , even when there is an excess of O_2 . No reaction taking place under these circumstances.



In view of the above results that we are led to change the representation of the place in the leaden chambers.

V. d. W.

PRIMEVAL AMERICA.

As styled the New World, America is a civilization almost as old as Egypt or

Asia. In the unbroken solitudes of Central America are cities rivaling Thebes or Babylon. Overgrown with dense forests are the ruins of once magnificent palaces, gorgeous temples and gigantic pyramids. The walls are rich with carvings and the ground is strewn with broken statuary. Further north, in the great valley of the Mississippi, covered by forests at least 800 years old, are to be found earthworks as varied as they are numerous. These extend over the greater part of the Ohio and Mississippi valleys, including the Gulf States. They are found, more or less numerous, from Minnesota to Louisiana, and from Florida to Texas. Ohio alone contains from 11,000 to 12,000.

Some are vast embankments of earth or stone crowning steep and inaccessible hills. Others, built on the level plains of the valleys, are great enclosures of earth in the forms of geometrical figures, connected by avenues, and having in or near them mounds of different sizes and shapes. The mounds are the most numerous remains, and are frequently found alone on the hill tops and in the valleys. Some are little hillocks; others cover acres, and are from 70 to 90 feet high.

Of the nation that built these wonderful works, we have no history; even its name is unknown. On account of the number of mounds that they have left, we call them the Mound Builders. Whence or when they came is a mystery. Their origin as a race extends far back into antiquity. Their rude though often imposing works have the impress of native genius and development, and are their only witnesses. To them we must go, armed with spade and mattock, if we wish to learn of their architects.

The principal classes of the earthworks are geographically divided into three regions, leading many to believe that they were built by separate and distinct races at different times. But they so gradually blend into each other that it is hard to tell where the one ends and the other begins.

The State of Wisconsin is covered with gigantic *bas-reliefs* of men and beasts. One of this class in Ohio is a large serpent, with a body 1,000 feet long, ending in a triple coil, and having between its widespread jaws an egg-shaped figure. The Southern states abound in truncated pyramids that are often terraced and have graded ways leading to their summits. One of these in Illinois covers 8 acres, is 90 feet high, has a flat top of 5

acres, and contains 20,000,000 cubic feet of earth. The latter may have been sites of temples or the elevated places where the solemn rites of their superstitious builders were performed, and are connecting links between the Mississippi valley and Central America. The last division is principally in Ohio, where are found all classes in the greatest profusion. The Mound Builders seem to have chosen the fertile valley of the Scioto as the seat of their empire and densest population. Along the northern part of the State and extending into Western New York, crowning high hills overlooking the valleys, was a system of strong fortifications that often covered many hundred acres, and was surrounded by several miles of embankments. When not near springs or streams, each had within it several large reservoirs, capable of holding an almost inexhaustible supply of water. The gateways were perfect mazes. The walls on the sides most easy of access were frequently 15 or 20 feet high, and had deep ditches on their outer sides. Together with these were a series of look-out or signal mounds, extending down the valley. By lighting watch fires it would have taken but a few moments to have sent a signal from the north to the inhabitants of the south. These seem to have been the outposts of the Mound Builder's empire, as they are not found south or west.

The mounds in the valleys belong to two classes, and are the most interesting remains. One kind contains human bones, with various articles of pottery, such as water jugs, cups, bowls and vases that are often filled with a black mould, as if they had contained some kind of food. These are burial mounds, and were erected only over the chieftains, priests, and perhaps over the ashes of distinguished families. But one skeleton, wrapped in bark or matting, and often within a rude vault of wood or stone, is found in each. The larger mounds, like the great mound in Western Virginia, contain many more, and are likely the burial places of kings, who, like those in Scythia of old, were interred with their nearest kin and earthly riches. The greater part of the people were buried in large cemeteries, the remains of which are frequently found. Cremation and urn burial were practised to a limited extent.

The other class of mounds are near the enclosures. In them, and on the original surface of the ground, are dish-shaped altars of burnt clay. Among the ashes that cover them

are the offerings, such as implements and ornaments, of bone, copper and mica, pipes and carvings in stone and ornamental pottery, all much injured by the heat. Above these the mounds are raised in successive layers of sand and clay. They are called the sacrificial mounds, and are always found in what may be called the sacred enclosures, or rather system of enclosures. These are sometimes very large, having as many as fifteen miles of embankments, and covering four square miles; it is impossible to gain a complete idea of what they were, as wood must have been used a great deal in their construction; they are, then, only the ruined foundations that have survived after the long lapse of ages.

The sacred enclosures were built in regular figures, circles, squares and polygons, and have the ditch along the inner side of the walls. They are connected together directly, or by parallel lines of earth; a small mound is on the inside of each gateway. Considering that, to-day, with all our mechanical aids, it would take many thousand men many months to erect similar works, we can gain some idea of what a dense population filled our valleys; but the modern Indians have no traditions of them. They were a simple, laborious people, given to the practice of agriculture, and acquainted with many of the ennobling arts. Maize was their principal food. They were great smokers. The use of tobacco formed a part of their religious duties. Axes and other household implements of hard stone, finely carved pipes, spears, arrow heads, hoes of various flint-like substances, and tasteful ornaments of slate, attest their skill in working in stone. They mined the native copper on the shores of Lake Superior, and beat it into many useful and ornamental forms. The pottery from the mounds is of fine workmanship and often of an elegant design. They wove a cloth from the twisted fibres of bark. Sea shells, mica from North Carolina and obsidian from Mexico, found in Ohio mounds, show that they had a commerce. From the great perfection of their circles and squares, we conclude that they had a standard of measurement and a mode of determining angles. They had a written language.

The features depicted on their pipes, and a few authentic crania, show them to have been an intellectual race. Their features were more regular than those of the Indian. The nose was straight; the mouth, small; the lips, thin; the chin and upper lip, short; contrasting greatly with the coarse features of the latter.

in form of government was undoubtedly
ic, or a great centralized power; the
part of the people not being free men.
religion was the blackest paganism;
orshipped the elements, especially fire,
er with the sun and moon, which were
lized by the oft recurring circles and
ts. Nothing was too costly to be
l on their altars; minerals and rare
s brought from a distance, and, as the
d bones tell us, even human victims, on
occasions. How imposing, could we
ate the countless ages and see the vast
sions wending their ways through the
venues from the sacred squares to the
ltars in the mystic circles.

ut fifteen hundred years ago these
rful people, after a long and valiant de-
were driven by some hostile hordes from
orth to the Sierras and plains of Mexico
entral America. There, like a concen-
flame, their civilization shone forth with
led splendor. "The history of their fall,
strange monuments could speak, would
rhaps, of heroic defence of homes and
and of daring achievements in siege
sault." R. M. A.

OBELISKS; FROM AN ENGINEERING STANDPOINT.

PAPER I.—QUARRYING.

has been my privilege, during the past
months, to consult such authorities as
ason, De Roziere and Herschel, in con-
n with a course of study on ancient
ecture. It is, therefore, with a belief
shall succeed in giving my readers some-
le as well as interesting knowledge, in
e condensed form than they can else-
obtain it, that I enter upon the subject
me. In spite of our boasting, and in
f the machinery—which some one has
styled "intelligent"—of the daring
n world, we fail in explanation of the
ds pursued by the Egyptian engineers,
ave commanded the admiration of man-
hroughout all succeeding generations.
so much in the way of preface, I will
ed to the special topic of this paper.
existing obelisks, with but two or three
ions, are of red granite, from Syene
ian); whence the name, Syenite, as
d to a certain combination of minerals.
quarries are situated upon the banks of
le, below the first cataract; thus placing
autiful stone within easy reach of the

art centres of the Egyptian kingdom. The
rock is hard as iron, and as a result, takes a
brilliant polish. Another quality, which
should not be overlooked, is the remarkable
absence of veins of foreign matter, or of any
other defects which are usually as common.
But, how were these granite blocks cut from
the parent rock? How could workmen, with-
out steel, as is generally believed, chisel into
shape the rock, when at last it lay a rough and
unformed mass upon the quarry floor? Let
us consider the first question.

There have been three totally different
theories advanced as to the method of separ-
ating the masses of rock. Let me briefly re-
view each:

1. *Cleavage by a sudden blow.*—This theory
holds that the block to be detached was
roughly squared up on five sides, leaving one
face, a vertical one, uncut from the solid rock;
that the line of this face was marked out by a
chisel, cut about two inches deep, and that
upon a blow from some great machine, the
block was separated, after the manner of glass
cutting. The statements of other explorers,
however, does not bear Belzoni out in his ar-
gument. Indeed, I should like to see plans of
any machine which would distribute a blow
evenly over 100 linear feet, and also the rock
after the fracture had been made. I know
that machines have been sketched by men of
fertile imagination; but, as we have no ancient
drawings of such machines, it is fair to assume
they never existed outside of modern paper
and ink. Again, it is hard to believe that a
cut two inches deep would be sufficient to in-
sure the even splitting of a granite mass at
least thirty feet long and four feet thick.

2. *Cleavage by fire.*—Well authenticated
statements are not wanting in support of this
theory. Long ago, in describing the gold
mines of Egypt, Agatharcides states that the
rocks were split by burning wood. Unfortu-
nately, he has left no account of the methods
employed. Sir J. F. Herschell adduces testi-
mony from the granite quarries of India. He
says: "In the granite quarries near Seringa-
patam, the most enormous blocks are separ-
ated from the solid rock by the following
neat and simple process: The workmen, hav-
ing found a portion of the rock sufficiently
extensive, and situated near the edge of the
part already quarried, lay bare the upper sur-
face and mark on it a line in the direction of
intended separation, along which a groove is
cut with a chisel about a couple of inches in
depth. Above this groove a narrow line of

fire is then kindled, and maintained till the rock below is thoroughly heated, immediately on which, a line of men and women, each provided with a pot full of cold water, suddenly sweep off the ashes, and pour the water into the heated groove, when the rock at once splits with a clear fracture. Square blocks, of six feet in the side, and upwards of eighty feet in length, are sometimes detached by this method."*

3. *Cleavage by wedges.*—The grooves described by Herschell have been repeatedly observed in the quarries of Egypt. In the latter instance, however, there are cut holes—obviously for wedges, either of wood or iron. Besides these holes, others have been found in which the groove is wanting. Upon these differences are based the distinctions between the use of wood and iron. The wooden wedges were used in conjunction with the grooves. Well dried wood was inserted in these holes, and water poured thereon. The uniform swelling of the wood produced a most satisfactory fracture. Wilkinson is the only one of the writers accepting this explanation who thinks it worth while to mention that the grooves were probably to direct the course of the water, and not merely to mark the line of fracture. He believes this to be the *only true method*, and asserts that "the percussion of iron wedges could never be instantaneous along the whole length of the block, and the risk would be incurred of breaking the shaft into at least two pieces."

Another method of employing iron wedges hardly comes under Wilkinson's criticism. It is described by Col. Wilks as a Hindoo solution of the problem :

"The workman looks for a plain, naked surface of sufficient extent, and a stratum [Col. Wilks confesses that this term is ungeological, as applied to granite, but says that no other word will well describe the kind of mass from which these large blocks are taken] of proper thickness, sufficiently near the edge of the rock to facilitate the separation, or made so by previous trimming. The spot being determined, a line is marked along the direction of the intended separation, and a groove, about two inches wide and deep, is cut with a chisel; or, if the stratum be thin, holes of the same dimensions, at one and one half or two feet distance, are cut along the line. In either case, all being now ready, a workman with a small chisel is placed at each hole or interval, and with small iron mallets the line of men keep beating on the chisels, but not with violence, from left to right or from right to left; this operation, as they say, is sometimes continued for two or three days before the separation is effected. Those who have seen the mode of cutting, as it is called, of plate glass, will not be surprised at this beating from one end, and

the fissure also taking place from one end to the other. This is the mode by which the Seringapatam stone was separated."*

Frequently, according to some, rarely according to De Roziere, saws were used. It has been conclusively proved that the metal used was copper, and to give it the power requisite to attack the stone, sand was used. This instrument was employed on deep vertical cuttings, where to the present day the marks of saw teeth and copper oxide are found.

I have tacitly assumed up to this point that the last cutting was *always* a vertical one. This, however, is not the united opinion of Egyptologists. Cooper says that the stone was supported from beneath until nearly sawed through, when it was allowed to break off by its own weight. In support of this belief, he cites the instances of sarcophagi, now in the British museum, which have a rough appearance at the lower edge. Goringe, on the other hand, regards this as the result of accident, and not indicative of the usual method. He states in evidence that the unfinished obelisk now lying in the quarry (Assouan) is "evidence that, at least in the extraction of blocks intended as obelisks, the under horizontal surface was the last to be separated." In cutting this last surface, supports of native rocks were left at regular intervals, until it was possible to jack the mass up with beams; then the rock supports were cut away, and the block was free.

Now, if Goringe (and Wilkinson) is right in such an opinion, it is only when the third method of cleavage was employed. And, even in that case, we have his own words, when he says: "Both Gau and Ebers remark upon the great care shown by the Egyptian workmen that the valuable syenite should nowhere be cut to waste." Would not it be a great waste of syenite, and time as well, to cut the block free in the manner just stated?

I have said that only in the third case can such a method, as that of leaving the under face till the last, apply. Take away from the first method the assistance of gravity, and a powerful machine might batter for ages against the marked-out block, with no prospect of ever getting the latter free entire. In the second case, it would be unnatural that fire should be built *against* the rock and water afterwards dashed *against* the rock, when the fire might be built above and the water merely run on.

* Goringe: Egyptian Obelisks.

* Goringe.

tion this point in regard to the facts, if it can be definitely settled whether the face was a horizontal or a vertical will be able to determine the method used in separating the masses of rock.

CHIC.

JULIUS CÆSAR OF SHAKESPEARE.

When we find the character of one of the men that have ever lived, portrayed by the greatest dramatist that the world has known, we would naturally expect to find a full view of his intellect and the wonderful range of his nature delineated and emphasized as a Shakespeare could. However, the play does not seem to recognize the greatness of Cæsar; since, in the acts in which he is made to figure, he does nothing, except to utter a few pompous words. He is entirely at variance with that Cæsar whose character, as given by history, was as compact and firm as

Shakespeare drew from Plutarch the historical outlines and most of the characters of his "Julius Cæsar." Plutarch's biography of Cæsar is very imperfect; but this does not fully afford sufficient explanation of the great inadequacy of Shakespeare's representation, for the latter does still less justice to Cæsar than Plutarch had done.

It seems reasonable to suppose that the dramatist, making the attempt of the republican main theme, could not venture to do too great an interest in Cæsar. It was necessary to keep him in the background, and that view of him which gave a reason for the conspiracy. If the true character of Cæsar had been fully represented, it is evident that such men as Brutus and Cassius would never have been brought into the prominence in which they are presented to us. For there is nobility in Brutus or Cassius, but not in showing at the expense of the character of Cæsar.

There is evidence that the dramatist really did not understand the mightiness of Cæsar; for, in the play, he delivers himself so far from a true view of his true character, yet both his friends and foes represent him much nearer to what he really was. This is especially evident in the speech of Mark Antony over Cæsar's body. In the latter part of the drama, the greatness and right of mastership over the world is vindicated. Cæsar's blood cements the empire which the conspirators wished to

destroy in its infancy. He proves as powerful in death as in life, so that Brutus exclaims: "Oh, Julius Cæsar, thou art mighty yet! Thy spirit walks abroad, and turns our swords into our own proper entrails."

Whilst other men have been reputed great in one department of human genius, it was declared by the voice of antiquity that Cæsar was great in all. As a statesman, a general, a legislator and as a historian, he has never been surpassed. Although a short period of time intervened between his accession to power as the head of the Roman Empire and his death, yet it sufficed for him to undertake measures that have been a lasting benefit to mankind. He it was who instituted the "Julian calendar," the inaccuracy of which was so slight that it did not require correction for sixteen centuries. A more extensive project that he began was the geographical survey of the Roman Empire. This work was not completed until some time after his death. He also commenced the herculean task of collecting and remodelling all the fragments of Roman law into one compact code of laws, but his untimely death prevented the accomplishment of this undertaking until about six centuries later, when Justinian finished it.

These and other such projects were engaging the attention of Cæsar at a time when Shakespeare represents him as lording it over Rome, and strutting around Rome with the boastfulness of one who would say: "Hush! for I, Cæsar, a demigod, speak."

If Brutus erred more than Cassius in the means that he employed in the assassination of Cæsar, they both erred equally in their final aim. The restoration of the Republic was a plan no longer feasible, as the people had become unfit for political freedom. Nothing did so much to set them in love with royalty as the reflection that their beloved Cæsar, the consummation of Roman genius, was foully murdered for aspiring to it. The characters of Brutus and Cassius are best described by the saying that the former "hated tyranny," the later "hated tyrants."

Shakespeare shows Cæsar's contempt of danger as well as his unbelief in prophecy, when the soothsayer cries out: "Beware the Ides of March!" and Cæsar answers: "He is a dreamer, let us leave him." This feature of Cæsar's character agrees with history. However, taken as a whole, the drama of Julius Cæsar does not do justice to one who "bestrode this narrow world like a colossus."

TITAX.

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“**N**OLL for the brave, the brave who are no more.” With this number the old board of editors goes out of existence. It would not be very becoming if we were to end our career amid wails and lamentations, hurling accusations against all that have neglected to acknowledge the grandeur of our work, or have failed to assist us in our task. No, indeed; it would ill become us to leave this editorial vale of tears without being at peace with all the world. So let us, instead, strike the lyre of praise; let us thank all for their warm support; let us rejoice at the numerous reforms that were wrought through our humble means; and, throwing off the bondage of editorial slavery, let us pass through the golden gates to the land of freedom and of criticism.

WE noticed in the *New York Times* of January 28 a letter from a graduate of Yale. He touches mainly on the widely-spread evil of the marking system. According to him, the instructors at most American colleges do not attempt to teach, but sit merely as judges of a student's knowledge

of a lesson, and “pump” him in recitation. We are glad to be able to state that our Institute is far in advance of other colleges in that respect, going, as it does, in some departments, almost to the other extreme. Students come here to be *taught*, and, as a rule, they are taught. As far as *learning* is concerned, there is no reason why a man should attend any school, no matter how great its reputation, merely to show that he has *learned* a lesson. Notwithstanding the reasonableness of the above, we have often heard students complain of some imaginary injustice done to them in the marks on recitations. How is it, then, that men coming to an institution to get knowledge end by requiring marks, and appear satisfied if the latter are satisfactory, no matter how poor their knowledge of a subject may be? We believe that the chief cause of this may be found in the fact that outsiders, parents of pupils, and other interested persons judge of a student's knowledge from his “marks”—making them an absolute yard-measure of a person's learning! Convince the world at large of the fact that “marks” are no criterion, that “marks” are not synonyms of knowledge, that “marks” are not always righteously and fairly earned, and the uselessness and absurdity of this *idolon scolae* will induce even conservative college professors to use it more sparingly.

COMMUNICATION.

To the Editors of the Indicator:

It is not my object to pose as a critic, nor to find any fault whatever with either the INDICATOR or its management; but one article in the January number, an able one in many respects, seems to merit criticism from the fact that it contains words highly objectional to a race that certainly deserves better treatment by Americans. I refer to Chic's, and quote the passage: “Soon the man who manipulates the street sweeper will sign his name (if, indeed, he is able to write) Patrick O'Hoolihan, M. E. It looks well in print, doesn't it?” Every one knows that that name means an Irishman, and this, in the eyes

ic," is a synonym for an ignorant man, rant that it is doubtful if he is able to. But "what's in a name?" Michael y sounds about as Irish as Patrick ihan, and he must have had considerable ood in him, or he never would have t name. Does "Chic" think it looks rint? Does the fact that Prof. Tyn- l Sir Wm. Thomson are Irish render ontributions to science any the less e?

on earth can astronomers expect to progress if they persist in looking a telescope made by that Irishman, loss? Prof. McCulloch, of Trinity , Dublin, it has often been said, is one ablest mathematicians of our time ; must be a mistake, for he is Irish.

for the sake of an argument, I will hat they are an ignorant race ; then sk the question : Why do you blame

There was a time when Ireland was it of learning ; her scholars were l to with the greatest reverence at the f Charlemagne and in the Roman s, and learned men from the various es eagerly visited them at their homes ; nasteries were famous for their learn- l their libraries ; there the arts were d—music, architecture, and the work- metals.

ere the languages of Greece and Rome udied with the passionate zeal which rds distinguished the Humanistic s of the revival of learning,"* * * and, ly enough, one of the oldest manu- of Horace, that in the library of Berne, en in Celtic characters with notes and ntaries in the Irish language.

talementert says that "of all nations the Saxons derived most profit from teach- the Irish schools, and that "Alfred and received his education in an Irish sity." About the end of the eighth the Danes made their first descent Ireland, and for nearly a hundred he "sea kings" held sway until they nally driven from the island. Then ngland, as has ever been her policy, e Irish nation was weak and bleeding er century of combat, and once more ntry was under foreign rule. For long centuries has she struggled for hich all Americans, and all beings of the name of men, prize dearer than erty! For seven centuries have her

people suffered oppression and murder unparalleled in history, inflicted by a government that to the cruelty of Nero added the hypocrisy of law to justify its deeds.

I call it murder, and history will uphold the term. Here is how an English author, A.D. 1647, preached the extermination of Irishmen:

"I begge upon my hands and knees that the expedition against them may be undertaken while the hearts and hands of our souldiery are hot, to whom I will be bold to say briefly: Happy is he that shall reward them as they have served us; and cursed be he that shall do the work of the Lord negligently: *Cursed be he that holdeth back his sword from blood!!! Yea, cursed be he that maketh not his sword stark drunk with Irish blood*; that doth not recompense them double for their hellish treachery (all enemies of England are 'treacherous' and 'rebels'—Washington included); *that maketh not heaps upon heaps!! and their country a dwelling-place for Dragons, an astonishment to Nations!* Let not that eye look for pity nor the hand be spared that spares them, and let him be accursed that curses them not bitterly!!"

In less than two years after the above was written, Cromwell went into Ireland with ten thousand men, and no one can truthfully say that he did not carry out its precepts to the best of his ability. After the Drogheda garrison had surrendered, he put to the sword "every man related to the garrison, and all citizens who were Irish. man, woman and child." So says Clarendon, and he was an Englishman. Cromwell, himself, impiously laying the "glory" of it to God, boasted that not thirty escaped with their lives; "those that did are in safe custody for the Barbadoes"—for he sent the Irish by thousands, as SLAVES, to the West Indies and other American colonies.

I pass over the famine of 1741, when thousands died by the roadside, and also the uprising of '98, when the noblest of patriots, Robert Emmet, was "hanged, drawn and quartered," and, according to an eye witness, "the dogs of Dublin lapped his blood from the gallows-foot, in Thomas Street"—down to within the memory of thousands of men living to-day. I refer to the famine of 1848, when thousands died the horrible death of starvation, and thousands more fled to America and other countries, while *their* (?) government sat calmly looking on, scarcely thirty-five miles

away, never offering to help them, but rather to add to their misery, by legislating for a system that robbed the poor wretches of their all, in order that the princes and lords of the nation might roll in wealth. Had it not been for the charity of America, thousands more must have met the same fate; as it was, after all was over, it was found that the country had lost TWO MILLIONS of its people. Truly, has their beloved Goldsmith said:

"Ill fares the land to hastening ills a prey,
Where wealth accumulates and men decay."

(I think it is admitted that *he* was able to write.)

Still the battle goes on, and the Irish in Parliament, to-day, are struggling as their forefathers did centuries ago; it is only the indomitable courage of the race that renders their conquest impossible.

That they are courageous, can be seen by the history of almost any country. America has certainly no reason to complain, for they shed their blood in her defence as freely as for their own dear Erin; therefore, I say they deserve better treatment from American hands. You may wonder why one born in America should be so intensely Irish, but I am sure, were you in his place, you too would feel the blush come to your cheek when insults were thrown at the race from whence you sprung; you, too, would feel the blood quicken in your veins when you thought of the miseries and oppression heaped upon the land of your forefathers; for

"The blood of a race that is wronged beats longest of all;

For long as the wrong lasts each drop of it quivers with wrath;

And sure as the race lives—no matter what fate may befall,

There's a Voice with a Song that forever is haunting its path.

"Aye, this very hand that trembles through this very line

Lay hid, ages gone, in the hand of some fore-father Celt,

With a sword in its grasp—if stronger, not truer than mine—

And I feel with my pen what the old hero's sworded hand felt."

IRISH AMERICAN.

INDICATOR CARD.

We took a card last week in one of the Sophomore recitations. It lacked distinctness and was very erratic in form. The explana-

tion is simple. In our experience we have found that the quality of *distinct pronunciation* is not popular with the students. It is very annoying, during a recitation, to have a man in the front row rise to answer the professor, and then speak in a mumbling tone, scarcely audible even to the professor. The rest of the class gain no benefit from such a recitation; and even the professor, in his knowledge of what is correct, often imagines the correct answer to have been given, while the student conceals his ignorance in a convenient muttering tone.

In order to obtain as characteristic a card as possible, we went to Prof. Wall's room. Here we found the professor frequently saying, "Will you repeat your statement, Mr. Blank; I missed a word or two." The curve was broken at these points, and changed form, so that one might almost have said that each branch was a separate card. We have oiled up the troublesome part, and replaced the half inch by an inch steam pipe. By these means, we expect to overcome the resistance.



"Turn to the 252⁶⁸/₁₀₀ page."

What's that, I hear? The Hoboken rink for a gymnasium?

The Sophs. have a new class room. Whist! don't say anything.

The glee club and their latest attraction, "the whistling boy," scored a great success in Brooklyn.

"Oh, for a thousand tongues," sighed the Freshman, as he tried to get a word in edgewise at class meeting.

The mangled heap thrown away by one of the High School Profs. is said to be all that was left of a poor Prep.

The "Black Hole of Calcutta," as the Sophs. designate their class room, is lighted by a beautiful chandelier with one burner.

The Sophs. are rather backward about discarding their milk bottles. Do they think the Freshmen have been living on air all this time?

photographer was around again to get a picture of '87. He knows where to go when he wants a fine one. "They are out will be better."

essor, lecturing on the microscope :
"You see that sheet of paper? You say it's smooth, don't you? Well, it isn't. It's covered with fuzz, like a Freshman's

Freshman class presented Mr. Idell, Christmas, with a handsome water glass; as a slight token of their appreciation of his great kindness to them during his brief stay as instructor of mathematics.

her Goose, applied to the Freshman :

Multiplication is vexation ;
Division is as bad ;
The rule of three perplexes me,
And fractions drives me mad.

Seniors now begin to dream nightly of the subject about every other day, and in two or three weeks more of rambling prospect to find a pasture suitable to their wishes. We wish them all success.

class meeting, held by the Freshmen, following officers were elected : Hoxie, *President* ; Peck, *Vice-president* ; Mack, *Secretary* ; Finch, *Treasurer* ; Harrison, *Historian* ; and, *Chaplain*. After a spirited discussion of the issues," the meeting adjourned.

has any one seen Donald? Donald, loved "yaller dog." We miss his gentle form from our midst. It cannot be that he has gone from among us forever. How could we have the thought, much less the reality. Boo! Booh hoo! Send us a towel!

following arithmetical problem presents a great difficulty and is rather interesting to account.

A cat and a half kills a rat and a half in a minute and a half, how many cats will it take to kill one hundred rats in fifty minutes?

senior approached the janitor the other day and was heard asking "Who is that gentleman in the library looking disatisfied and evidently perplexed to find you out?"

W. J. : "Hoh! that is Mr.-er-a-er-n is his name."

S. : "Mr. S., what word is derived from the use of taste?"

S.—"Smell." (Class laugh up and their backs and around their paper col-

lars. Prof. tries to turn inside out, but can't. Mr. S. tries to evaporate, but he also gets stuck. Red lights and grand crawl.)

The committee on "class day" for the commencement week of the Senior class has been discharged, which virtually amounts to saying that there will be no "class day" for '86. The members of the class do not appear to be enthusiastic over it, and the dismissal of the committee will probably end the matter.

The "missing link" and Freshman 2
Were walking out on Sunday ;
Said "missing link," to Freshman 2,
"To-morrow will be Monday."

"By gracious me!" said Freshman 2,
"How came you by that knowledge?"
Said "missing link," to Freshman 2,
"I got it at the college."

Adding insult to injury.

Prof. (to student busily drawing), "Mr. M—, that is a very peculiar way to draw."

Mr. M—: "Hang you, I can't help it."

Prof.: "But you must help it."

Mr. M—, (looking up): "Oh!!!! I beg your pardon, professor, I thought you were one of the boys."

'89 has produced a very peculiar specimen. It wears kid gloves in the shop and is very loth to get a spot on its immaculate overalls. It wears glasses and a nice, little blonde bang, and it sits carefully perched on a clean pine board, while its partner works the lathe. How nice it must be to have one of those, '89. Are they expensive?

A Freshman, who hails from one of the Southern States, was discoursing at length on the advantages of his section of the country for the smelting of ores. The strongest point in his argument was that "the climate was so much warmer, it required much less fuel to melt the ore; and, consequently, they could sell much cheaper than in the North."

In selecting "Bloxam's Work on Metals," Prof. Leeds has, in our opinion, furnished the Juniors with a text-book exactly suited to their needs. It treats the subject in a clear and concise form, which, with the valuable additions made by the professor in explaining certain parts at greater length, ought to give the class as complete a knowledge as could be obtained in the limited time at their command.

Prof. Lackland polished the Sophs. in fine style a short time since. After the shop had started, the whole class went up to a class

meeting without consulting his Royal Highness, whereupon his R. H. immediately became "riled" to a considerable extent. So much so, that he procured his class list and marked the whole class absent, notwithstanding the fact that they were absent less than fifteen minutes out of the three hours. Hurrah for liberty and justice!

Feb. 1, 1886, was remarkable for the number of phenomena occurring at the Institute. About eleven o'clock a certain Mr. Denton was discovered lecturing to section No. 2 of the senior class. On the same day, the distilled water and C. P. (?) H. Cl. supply failed in the Chemical Laboratory. Complaint was made that the standards in the Physical Laboratory had shortened one ten thousandth of an inch. Galvanometers spun about like pin-wheels, and the meter shrunk itself out of adjustment.

There is talk of turning the Hoboken Roller Rink into a gymnasium for the Institute. An item was published recently in one of the New York papers to that effect. We have heard nothing from the faculty in regard to it as yet. If the report is a true one, it will be most heartily welcomed by all the students, for if we ever were in need of a thing, it is a gymnasium, and it has always been the aim of the INDICATOR to push on any movement in that direction, and if there is any hope of one now, the INDICATOR will not let the matter rest here.

'88 has done what no other Sophomore class has done before. She has managed by dint of talking and scheming to get a hat room for her own exclusive use. It is the room previously used by Prof. Thurston. The ventilation is somewhat faulty, and in consequence of its defect in this respect, it has received the appropriate name of "The Black Hole of Calcutta." Fifteen or twenty students staying in the room for a short time will make the atmosphere anything but a desirable one to live in, and while '88 thanks the Institute for what it has already done to the room, the class would be doubly thankful if the Institute would continue the good work and take measures to make the air wholesome, thus giving the members of the class a place where they can eat luncheon or study, as they desire.

There seems to be an everlasting and natural feud existing between the "Preps." and the young representatives of the population of

Hoboken. For some time past, there has occurred, every noon, a spirited contest between these opposing factions. A miniature Waterloo, as it were—rocks, bricks, bottles and coal being the favorite articles of warfare, intermixed with some very choice expressions and names. It is rather hard to say which party is victorious; but it's very easily seen that it is becoming somewhat dangerous to pedestrians and uninterested persons. A three pound chunk of coal or a glass bottle is not extraordinarily interesting when unceremoniously introduced; so if the Freshmen wish to distinguish themselves, they have the opportunity of doing so by exterminating the "Preps."

'88 has every reason to be satisfied with the decided improvements which have been made in the Department of Chemistry. Formerly the Sophomore class experienced great difficulty in mastering their chemistry with any degree of satisfaction, either to the professor or to themselves, even some of the best students being conditioned. This was owing to the many different topics to be studied and the great difficulty in selecting the important ones. But Prof. Leeds has greatly simplified the subject by dictating questions before the recitations and making the recitations on the questions dictated, also by taking the examination questions from those dictated during the term. This gives the students a specific amount of work to do, and with a reasonable amount of study any student ought to be able to pass a good examination if not an excellent one. The improvement is certainly a long needed one, and Prof. Leeds is deserving of much credit for the change which he has made.

GLEE CLUB.—In answer to an invitation from the Young Peoples' Association of the Washington Avenue Baptist Church of Brooklyn, a double quartette from the Glee Club sang in the parlors of the church, on the evening of January 25. The invitation was given through Mr. Field, who is Business Manager of the club, and also an officer of the Young Peoples' Association. The evening was an inclement one, but notwithstanding this fact the rooms were filled to overflowing. The entertainment consisted of reading, instrumental and vocal music; the club appearing three times with as many encores. They were very favorably received and were loudly applauded. After the entertain-

was over a vote of thanks was tendered club for their contribution to the pro- ce and for their kindness in coming a foreign country."

Brainard kindly assisted as "warbler" although the club showed the need of ce considerably they did very well con- ing that they have had none since last year. en selected for the double quartette being t year's men. However, the club has practising again and under the able ship of Mr. Cotiart they hope to do good work in the future. After the ses were finished Mr. Field gathered in boys," and conducted them upstairs he satisfied the "inner man" with ice and cake, the occasion being one of the ly socials given by the association. A time followed, and after another song e club, by most urgent request, the ing broke up and everyone went home d humor.

PERSONALS.

'79.

W. DASHIELL is now on another sec- of the new aqueduct, being with Brown & rd, contractors.

'82.

NON H. ROOD has the position of assist- perintendent of the Jeanesville Iron s, at Jeanesville, Penn.

'84.

ES S. ALDEN has been very ill with ner- rostration, but is now recovered and is well.

'85.

RY ABBEY is with the Cowles Electric ng Co., at Lockport, N. Y.

WIN BURHORN may be addressed, in care chell & Warden, boiler manufacturers, elphia.

N RUSBY is another of the Stevens grad- who are giving the united force of their to improve the method of manufacture, y the United Gas Improvement Co., at elphia.

BERT SILBER is with the Otis Elevator ew York City.

'87.

L. BROWNELL, formerly of '87, is taking se at Harvard.

E. G. COLDEWAY has been very sick with pneumonia at his home in Louisville, Ky. He expects to enter the Sheffield Scientific School as soon as his health will permit.

ENGINEERING NOTES.

A TABLE OF COMMON UNITS.

Horse power	=	33000 foot pounds per min.
"	=	550 foot pounds per sec.
"	=	746×10^7 ergs per sec.
"	=	7.460 megergs per sec.
"	=	75.9 kilograms per sec.
"	=	1.01385 force de cheval.
"	=	746 Watts.
Force de cheval	=	75 kilograms per sec.
"	=	542.48 foot pounds.
"	=	0.9863 horse power.
"	=	736 Watts.
Watt	=	0.013405 horse power.
"	=	10^7 ergs.
"	=	10 megergs.
"	=	2.2×10^4 kilograms per sec.
"	=	0.1029 kilograms per sec.
B. of T. unit	=	1000 Watts per hour.
C. G. S. unit	=	erg per second.
Megerg	=	10^6 ergs per sec.
Watt	=	10^7 ergs per sec.

The deep boring being sunk by the German government near Schladebach, with the ob- ject, especially, of obtaining trustworthy data concerning the rate of increase of the earth's temperature toward the interior, has at present given information corroborative of what has been obtained elsewhere. At the beginning of this year the bore had reached the depth of 1,392 meters, which is believed to be the lowest yet reached. The temperature at suc- cessive stages is ascertained by a special ther- mometer, the principle of construction being that as the heat increases the mercury will expand so as to flow over the lip of an open tube. The difference of the overflows will give the rate of increase of the temperature. It has been ascertained that the temperature at the depth of 1,392 meters was 49 deg. cent., or 120 deg. Fah. If the temperature increases regularly at this rate, the boiling point of water ought to be reached at a depth of 3,000 meters, or nearly two miles, and at 45 miles we should find the heat at which platinum melts. This would go to show that the rigid earth's crust cannot be more than about one-ninetieth of its radius; but the rate of increase is very different in different districts.



The *Hesperian* comes to us from the University of Nebraska. We have placed it with great pleasure upon our exchange list. Neat in appearance, replete with college notes, it will ever be a welcome visitor. But how about literary or scientific reading, friend Hesperian?

The *Troy Polytechnic* has set us a good example by offering to "advertise all books, instruments or furniture that students may wish to dispose of, *free of charge*. Advertisers must state description of goods briefly, and may state prices or not, as they please. If they do not wish their names published, we will give their addresses, on application, to purchasers." Can't Stevens work this scheme too?

In regard to the question, "Is the higher education of woman injurious to her health?" the *Miscellany* says, "One of our strongest desires has been gratified, since it now seems that we can say with confidence *a higher education for women is in harmony with that vast law of the survival of the fittest, which guides the activities of the dim future.*" We firmly believe in collegiate education for girls. In striving good-naturedly for the mastery, the maiden lifts the youth far beyond his own standard of study and forces him to exert his power to the utmost. As long as a girl keeps from airing any fancied superiority of education, she cannot be hurt by any course of study, however extended.

In a summary of the past foot ball season, the *INDICATOR*, in speaking at length of the game with Pennsylvania, says:

"The referee, unfortunately, was not acquainted with the rules of the game, and a great deal of dissatisfaction was caused by his decisions." We heartily echo the last statement, though we are somewhat surprised that it should come from Stevens, since the supreme ignorance of the referee was always turned to the advantage of the home team. This was especially the case in the second half, for while the home team more than doubled their score, the visitors only succeeded in adding four points to theirs, though the latter

had four times the points of their opponents in the first half. Throughout the article the *INDICATOR* attributes the defeats of the Institute team to incompetency in the referee, and yet on more than one occasion the referee was an Institute man. As a matter of fact, however, it is the most disheartening sort of a defeat, that which is brought about through the ignorance, either willful or unintentional, of the referee, which, in the latter case, is often caused by an excessive desire to be impartial to the college which he represents.—*Pennsylvanian*.



REBUKED.

Once on a summer day,
Far from the beaten way,
Some fairy bade me stray—

Cupid, mayhap.

Under a leafy tree,
Whom should I chance to see,
Whom, but my Rosalie,
Taking a nap!

There, in a lovely nook,
Screened from intruder's look,
Near her neglected book,

Slumb'ring she lay.

What could a fellow do?
Tell me, sir, wouldn't you
Kneel and take one or two
Kisses away?

Ah, but I broke the spell!
Opened her eyes, and—well,
Could I do else than tell

How it was broke?

Humbly for grace I plead;
Sternly she shook her head;
"Couldn't you wait," she said,
"Till I awoke?"

—*Harvard Advocate*.

Rev. Joseph Cook is superintending a farm near Ticonderoga. The other day a lonely tramp, passing near the Cook "mowing lot, heard a deep, sonorous voice cry out, like the call of a prophet: "Abandon the direct progression to the straight thitherward, and deviate by inclinatory and aberrant dextral gyration into a dextral incidence." It was Ultimate America saying "Gee" to his oxen. The tramp fled for his life. The oxen crept under the hay cart and cried.—*Boston University Beacon*.

* THE *

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MARCH, 1886.

* Stevens Institute of Technology, *

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—OF THE—

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No. 3.

THE FALL OF THE LEAF.

O cold ! cold ! cold !
 And the snow, with its soft, white fold,
 As spread on the frozen ground,
 And the trees that stand around
 Seem to shiver and shake their hoary heads,
 And whisper together as the old man treads
 The snow in the sad old grove.

O dark ! dark ! dark !
 As the mansion that stands in that park,
 And the ivy encircles its walls,
 And the echoes resound through its halls
 As the old man treads on its half-worn flags,
 Where the chairs are all broken and the curtains in
 rags,
 And the ceiling is blackened above.

O sad ! sad ! sad !
 As the walls in their drapery clad ;
 The old man sits in his low armchair,
 His skin is yellow and white is his hair,
 His eyes are closed and his heart is at rest ;
 His head is sunk on his shrunken breast,
 And the last leaf falls from the tree.

DIER BURNROTH.

LEONORA.

George Eastwood was my especial chum and boon companion at college. We had finished the first two years of study, and had just entered our junior year. Never, it seemed to me, had two men been born to so exactly suit each other as George and myself. Meeting, as casual acquaintances, during entrance examinations for the Freshman class, we at first kept together merely for that social sympathy for which every man placed among strangers yearns. Habit, however, forced himself upon us, and we at length grew so accustomed to being with each other, that any possible chance of our being separated would have been looked upon by us as a calamity. We pursued that excellent plan of studying together, thus mutually improving ourselves, at the same time strengthening the band of friendship which bound us, as we learned more about our common interests, and agreed in our opinions of the problems of our life and of life in general. Such were the relations between us, and such, we hoped and fully believed, would be our relations through

life. Our last summer vacation had been very pleasantly spent at my home, in a village on the Hudson. George, at my urgent request, had stayed with us throughout the summer, and made himself so pleasant a companion that the family, and especially my sister Grace, as I was afterward led to believe, regarded him with as much favor as even I did. We had returned to our college duties in the Junior year, as I have said, but before leaving home George had exacted a promise that I should spend the Christmas holidays with him at his home. "You won't find us such a lively set as your own family, Fred," he said to me, "but you may be sure that father and mother will unite with me in contributing everything to make your visit as pleasant as your family made mine," he added. George was a great artist, and made himself quite popular by drawing for the college papers and doing little works of art for the fellows. "You ought to see my picture of 'Leonora,'" he used to say, "and you shall, too, when you come out to my house."

Well, the holidays came at last, but as I had a little business to attend to in New York, George went on home first, leaving with me many entreaties to hurry through and follow him as soon as possible, in order to take advantage of the fine hunting which was offered just at that time of the year. Within a few days I had completed my business, and was soon on my way to Montebrook, a wild little place in the Alleghany Mountains. George was overjoyed to see me, and almost carried me to his home, where I was made so comfortable that I quite fell in love with the old folks. After supper, we sat down to have a little chat before retiring. "But," said George, "we must not be late, for I want you to come out before breakfast to-morrow and fish for pickerel through the ice. It's fun, I assure you." Before long we said good night, and George led me to my room. "I have hung up my picture of 'Leonora' in your room, Fred," he explained, as he lit the lamp, "but you must understand that you are to look upon it with some respect, for it is my ideal," and with a laugh he went to his own room.

Although naturally curious, I did not at first look at George's picture, but sitting down on a chair beside the crackling wood fire, I fell into a thinking mood; the kindness of these good people carried my thoughts far off to my own home. I must have been sitting so for an hour, I think, when I awoke from my reverie, and looked about the room. The first thing that struck my eye was a painting which hung over the chimney-piece, the life-size representation of a girl's head. Never in my life had I seen so beautiful a face; and as the flickering red light from the burning wood fell upon the canvas the image seemed to be imbued with life; nay, she even smiled at me once when a piece of fresh pine caught fire and threw its lurid light over the room. To say I was enchanted would do but scant justice to my feelings; I became convinced that when I should meet the person from whom that portrait was taken, it would be my lot to fall in love with her. To state the truth, I loved her already. When I went to sleep that night my mind was fully made up that George would give me an introduction to this lovely girl, whom it seemed I already knew so well.

The next day, in spite of the glorious fun we had fishing in the morning, and the excitement of preparing rabbit traps in the snow-bound woods, it was with difficulty that I could refrain from speaking about the subject that most filled my mind. However, that evening we had a talk, and such a talk it was, too! How George did laugh at me, and how foolish I felt when after pouring out my confessions to him and entreating him to let me meet my charming young lady as soon as possible, I found that no such person existed. "Did not I tell you that Leonora was my ideal?" said he, "the girl never lived, she is the mere creation of my fancy, which I have so represented on the canvas." I must say that I was somewhat disappointed as I went to my room that night, and yet, as I looked at that lovely face, the lines softened by the mellow light thrown upon it, it seemed to me that never had artists' brush so advantageously disputed nature's superiority in the delineation of beauty in the human face. The merits of the painting forced themselves upon me more and more, until—shall I own it—I became infatuated with the picture itself. As a work of art it did not impress me so strongly; but there seemed to be something so living, so real there that I could not but admire and covet it. The next evening, on telling George that I was in love with his

picture, he seemed to regard me with surprise and pity, "I tell you my dear boy," he insisted, "there is nothing in the painting itself; that is not what caught your eye, and as you express it, your heart. The idealty, which I created myself and so happily transferred to the canvas, is what lives for me. To all true artists their works are alive; whether, when created, they exist only in the artist's mind, or do truly live, is not for me to say; but this much I know, that my Leonora was evident to me, and was visible to my eyes long before I painted that picture. In common with other artists, I wish that people would look upon and criticize art, not for its workmanship, but for the idealty which it represents."

These thoughts, new to me, filled my brain that evening. Far into the night I sat in my room, and meditated until I grew almost wild with the richness, the perfection of the fancy. The most fascinating imaginations ran through my mind, and the longer I pondered, the more plausible, the more possible, the truer it seemed. My light burned low, and things in the room assumed a shadowy aspect. I glanced up at Leonora; how real she looked: how her eyes were fixed upon me; how gracefully her head inclined. "Of course, she lives," I thought, aloud. "Certainly I do," answered the sweetest voice that ever had saluted my ears, and there she stood smiling, nodding before me. "How strange you mortals are," she added, looking at me in a grave, sweet way, "why would you not believe in me before? Your friend, when he created me, referred often, in his thoughts, to you, and consequently I became associated somehow with you. I knew, I felt that I was made for you, and my love for your love. On that first night when you looked at me, I tried hard to make you understand me, but your thoughts seemed turned in another direction, and hope almost died within me." My heart leaped with a strange intensity. "O, my love," I ejaculated, looking into her eyes with a feeling almost of worship, "I knew you lived, but could not understand; our spheres are so different, and yet the world without you would seem to me void." "But I live in the world, too," she pleaded. "O, do bring me into your sphere; reach your hand across that invisible something which separates us." I hesitated; a confused consciousness of my inability to do as she implored, made itself manifest. "What can I do, Leonora?" I moaned. "Do? just reach out your hand and draw me over. Here, take my hand,"

etly said in an encouraging tone, yet shadow of fearful earnestness in her. She held out her hand to me; it was than mortal man could stand, I jumped and seized her hand. I felt its warmth; only there was a crash, and a fall. The faded up with a bright light, and there I saw George's picture devoured by the flames. I was over; I sank back into a chair, and I realized what had happened. I knew not until morning, when George came to my room to see why I had not made my appearance. A look of dismay and anger over his features as he regarded the wreck I had made. In vain I tried to explain, but he would not listen. "To think, that you should have so abused my ship as to throw into the fire and destroy this priceless picture, just because you coveted and envied me the possession of it." So he would have it, and the outcome of it was that I faded up and went home that very day. It was the end of our friendship, and, we are more estranged than if we had never met. A feeling of remorse often comes over me, when I think over the good times I had to have together; and yet, in my more thoughtful moods, I become conscious of a sweet presence that implores me, saying from me that I yearn to answer. My hands are bound, however, and I know not this world, at least, Leonora and I can meet.

ALBITAN.

LINKS; FROM AN ENGINEERING STAND-POINT.

PAPER II.—TRANSPORTATION.

In our attempt to decipher the hieroglyphics on Egyptian monuments we observe this as a fact: The authors of these records were of kings warlike and pious; of the building of temples; of wars and funeral obsequies; of science and the arts; but we search in vain to find any record of the sleds used to transport the immense masses of rock from spot to spot. Our only historic clue to a partial solution of the difficulty is a painting discovered in a tomb at Bersheh. To this painting—"Colossal Sledge,"—much interest attaches on account of its importance.

I may state, then, that our positive knowledge is as follows: "The shaft, placed upon the sled, was drawn only so far as the inun-

dation level, where it was left until the rising of the Nile should allow it to be drawn on board the raft." Beyond this, all is conjecture; very probable, it is true, but none the less conjecture. And it is here that Egyptologists have exercised all their ingenuity.

The inscriptions carved upon the blocks make frequent mention of galleys, rafts and sledges. As I noted in a former paper the Nile was the most convenient highway of transportation. Hence rafts were, in the great majority of cases, an absolute necessity. This, however, involved the use of sledges in transporting the block from the quarries to the water; so that, although sledges might be used without rafts, the use of the latter always involved the former. Having shown that the sledges were the more important, I will discuss briefly their construction and the method of operating with them.

The sledges upon which these crushing masses rested, were drawn usually by men. Occasionally oxen were brought into service, but it was only in cases where the burden was comparatively light. It may be asked how could these blocks be moved by means of a *sledge*? I answer, by sheer man-power. In one instance, the account reads, "two thousand men to draw the stones on sledges." Does it not seem strange that the beasts of burden should draw the chariots and carry provisions, while convicts and slaves were dropping in their tracks from over-work.

Thus these resistless Cars of Juggernaut moved on, leaving a blood-red pathway on the desert sand. In horror some one asks, "Were there no mechanical appliances?" As to this point there is a difference of opinion. Rawlinson seems positive that no levers or rollers were used; but Herodotus states particularly that there were levers. Add to this the testimony of Brugsch to the effect that rollers were used, and we have established an opinion contrary to that of Rawlinson. Among the various forms of sledges, I may mention a wagon-like structure, described by Gorringer:

"The Seringapatam obelisk was placed upon a low frame of timber, which rested upon eight low wheels. To this ropes were attached, drawn by about six hundred men at a time. The distance from the quarry to the site of the obelisk's erection was about two miles. Timbers were laid along the road, to prevent the sinking of the low wheels in the earth."

Turning our attention to rafts, we find that large boats were not uncommon among the Egyptians. According to Wilkinson, Diodorus

mentions a sacred boat of cedar, two hundred and eighty cubits, or four hundred and twenty feet in length. This instance is cited to show that large boats were in use, although there is no reason for believing that obelisks were transported by water by any means other than that of rafts. The Assyrian method of transportation is worthy of attention, since it is authentic, Layard having discovered sculptured slabs at Nineveh, representing the removal of huge stone bulls. I quote: "A huge block of stone is seen placed on a low, flat bottomed boat, which is towed on the river by cables drawn by about three hundred men. Again, the stone, now carved into a colossal bull, is seen placed on a sledge drawn by men attached to four cables. Rollers are laid beneath the sledge, and its hinder part is lifted and eased by the use of huge levers."

It seems hardly possible that, with all the wealth of inscriptions, there should be no records of engineering performances. We feel impelled to the belief that at some future time sculptures or paintings may be found in an as yet unexplored ruin, which may solve this enigma. And yet, when we consider that, as a rule, only the nation's history, arts and family life are depicted on these works of stone, and that the king, who ordered both the erection and the engraving, had scant interest in the method of attaining the desired result, we have every reason for believing that the *private records of an engineer or architect* were never put in eternal form upon these works of perseverance and engineering skill. CHIC.

SONG OF FIREWATER.

Should you ask me whence this headache,
Whence this vague, uncertain feeling,
I should answer with emotion,
'T is because of Firewater;
Of the Pow-wow, the Convention,
And the Jamboree, the Banquet.
Through the land from many quarters,
Many ancient halls of Wisdom,
Traveled day and night the students—
Traveled to the great Convention.
Came the grave and reverend Senior,
Followed him the stately Junior,
Then the unimportant Sophomore
And the miserable Freshman.
First they had a mighty meeting—
Chose new Chiefs to reign among them,
Talked of all the past and present
And made bets upon the future.
Thus they whiled away the hours
Of the Pow-wow—the Convention;
Passing thence in long procession
To the Jamboree, the Banquet.

Brought from all points of the compass,
Total strangers to each other,
Stood around the board together,
Laughed and joked amongst each other,
(Tones inaudible to mortals
Serve them for communication).
Then the students from all quarters
Took their seats about the table.
Here were viands in profusion;
Dainties in and out of season.
And when most of these had vanished,
Then the master of the pledges,
Straightway from his seat uprising,
Gave the toasts in mighty numbers.
And the students from all quarters
Loyally responded to them
For the glory of this College.
And as still the toasts went flying
They became more happy o'er them;
Stood on chairs and on the table,
That they might be heard the better;
Tumbled off, but rose serenely,
Thought to make another trial;
But forgetful of their purpose
Lay down underneath the table—
Sang weird songs and asked conundrums.
Then they rose with some assistance,
Sallied forth into the darkness;
Made it vocal and quite lurid,
Till they reached their resting places.
Then the festive little Freshman
Put to bed the reverend Senior,
With his head beneath the covers
And his feet upon the pillow.
Then unto his own couch went he,
Gently put his cane within it;
Stood himself up in the corner
And his spirit fled to dreamland.

ELEMENTARY BLOW-PIPE ANALYSIS.

V.

By an accidental omission, a portion of the last article referring to the treatment of the zinc incrustation with cobalt nitrate solution was not printed and will therefore be considered before proceeding to the next group.

The zinc incrustation is first produced either by an oxidizing or by an alternately oxidizing and reducing flame, then the incrustation is moistened with a dilute solution of cobalt nitrate, care being taken *not* to moisten the test substance; then cover this moistened layer of incrustation with another layer produced in the usual manner. After cooling, the coating will be of a yellowish green color. Far better results will thus be obtained than by heating the coating direct after moistening with the cobalt nitrate. Tin oxide is treated in precisely the same way, the only difference being in the resulting color which is a bluish green as has been stated in the last paper.

By means of group V, we are able to detect

by metals having intensely colored oxides, the oxides have the property of imparting a characteristic color to a bead of borax or phosphorous salt. A chemical combination between the reagent and the test substance does not occur when the latter is an uncombined oxide, which is almost always the case. The colored borax bead will, therefore, be considered as a very pure slag, holding metallic oxides in solution. In oxidizing or reducing, the different colors of the bead are due to the different degrees of oxidation of the test substance; the oxidizing producing the higher oxide.

If the test piece is in the state of a sulphide, antimonide, etc., it must first be converted into an oxide by *roasting*.

Sulphide being the most common, is converted by converting the substance into a fine powder, placing it in a shallow cavity, made in charcoal and treating with an oxidizing flame until a smell of sulphurous acid is no longer perceived; turn the substance over to the other side and treat in the same way, then remove it from the charcoal, powder it and repeat the process. When sulphurous acid is no longer produced, the substance has been converted into an oxide. Arsenides, etc., are roasted in the same manner. The additional apparatus for this group are several platinum crucibles .01 of an inch in diameter and 2-2.5 mm high.

The reagents are Borax, $\text{Na}_2\text{B}_4\text{O}_7 + 10\text{H}_2\text{O}$ and Phosphorus salt $\text{Am Na H}_2\text{P}_2\text{O}_7$, the latter being merely secondaries to distinguish substances which give different reactions with the borax. The platinum wire is provided with a loop at one end which is held into the oxidizing flame and dipped into the borax, the latter being so as to drive off the water; some borax is attached and heated again until a bead of sufficient size has been obtained. If the purity of the borax is suspected, allow the bead to cool *before* adding the test substance; it should be perfectly transparent. A phosphorus salt bead is made in the same way. In making a test, dip the heated bead into a small portion of the powdered substance and reheat in a strong oxidizing flame. When a color will appear, which depends on the test substance. The color is, in general, more intense when hot and becomes lighter on cooling; it may even disappear entirely when the bead of the test substance has been used. Contrary, if too much has been used, it becomes again opaque after cooling and should be reheated and squeezed flat with a pair

of forceps or a knife-blade, if this does not show the color, part should be knocked off and the remainder diluted with more borax.

When the reducing flame is applied to the bead a characteristic color is often obtained, which differs from that obtained by the oxidizing flame. Care should be taken never to treat substances containing nickel or copper in the reducing flame while on the platinum wire, as these metals reduce and form fusible alloys with the wire; borax beads containing them may be placed on charcoal and thus reduced. The common metals which can be detected by means of the borax bead are copper, iron, chromium, nickel, cobalt and manganese. Besides these, there are a number of rarer elements which give reactions with the beads, but the latter will not be considered in this place.

The oxidizing flame is understood when no other is mentioned.

Copper oxide produces a green color while hot, which changes to a greenish blue on cooling; in the reducing flame the oxide is reduced to the metal. In the phosphorus salt, copper oxide produces a greenish blue color, but when reduced on charcoal in contact with a small piece of metallic tin a reddish-brown color is produced, the bead becoming opaque. Very minute quantities of copper may be detected in this way.

Iron oxide, treated with a good oxidizing flame in the borax bead, imparts a yellow color to it, which may only be seen when hot, if very little iron is present. In the reducing flame the color becomes a bottle-green.

In the phosphorus salt the color is yellow, and in the reducing flame becomes brownish-black, like smoked glass or the mineral smoky-quartz.

Chromic oxide produces a yellowish-green color with the oxidizing flame, and an emerald-green when reduced. As this substance does not dissolve very readily it requires long continued blowing. In the phosphorus salt it produces a beautiful emerald green with both flames.

If chromic oxide is mixed with some soda and saltpetre and heated on platinum foil a yellow chromate is produced.

Nickel oxide produces a brownish-violet color when hot, which changes to brown on cooling; in the reducing flame the oxide is reduced to the metal, and should, therefore, never be treated on the platinum wire with this flame. In the phosphorus salt the substance produces a dark-red color while hot, which changes to a

gold-yellow on cooling ; in the reducing flame the color is neither changed nor the metal reduced.

Cobalt oxide produces with borax and phosphorus salt, in both flames, an intensely blue color, almost exactly like that which appears when copper sulphate is made alkaline with ammonium.

Manganic oxide produces, with borax, a reddish-violet color, which disappears entirely in the reducing flame, leaving the bead colorless, an effect which, however, can only be accomplished with a very good flame. In the phosphorus salt it produces very little color, but when the hot bead is dipped into powdered saltpetre, a foamy mass having an intensely violet color is produced, due to the formation of potassium permanganate. This is a very delicate test for manganese. If manganic oxide be treated, like the chromic oxide, with soda and saltpetre on platinum foil, a dark green color is produced.

The main use of the phosphorus salt bead is in the detection of silica, which is *not dissolved* by this salt, but remains in the bead in the form of small white opaque pieces, the whole of which are called the silica skeleton. Pure silica or quartz, as a moderately fine powder, will show this reaction best.

When a very large bulk of any earth, as alumina, baryta, strontia, or lime is dissolved in the borax bead, the latter assumes a milky color. This peculiarity, however, should seldom be used as a test, as better methods have been considered. O. Fr.

(To be continued.)

THE YOUTH OF ISAAC NEWTON.

Isaac Newton was born on the 25th of December, 1642. His father had died at the age of thirty-six, several months after his marriage with Harriet Ayscough. Isaac began his eventful life in the village of Woolsthorpe, in the parish of Colsterworth, Lincolnshire, four miles south of the city of Grantham. It is an historical fact that he was so small, as his mother used to say, he could be completely hid in a quart pitcher ; and he was naturally so feeble that he was not expected to live a day. But fortunately for posterity, providence had decreed otherwise ; and the powerless child developed into a man who lived in almost constant good health more than eighty-four years, thus surpassing the average duration of human life.

He was about *ten* years old when he entered the public school at Grantham ; still, as he himself acknowledged in after days, Master Newton was neither diligent nor attentive in school, and for more than a year constituted with several of his peers the bottom of his class. One day, however, a lad who was looked upon as the best student of the school struck him such a blow on the breast that the poor boy felt it yet some time afterward. Newton thereupon sought revenge. Since his opponent was by far his superior in bodily power, our fellow determined to beat him mentally. Aided by his natural ability, he began to work so diligently that henceforth we find him at the head of his school. This incident, unimportant as it may seem, served to inspire the boy, who, so far, had been almost passive, with inclination to action and occupation, and to develop the chief traits of his character.

Toward the end of his three years' stay at that public school, he spent his leisure hours principally in practical mechanics, in which he soon became very dexterous. He constructed a wind-mill, a water-clock, and also a wagon that was put and kept in motion by the passenger himself. Seldom do we find him taking part in the boisterous games of his young schoolmates, but, *instead*, he was also ready to assist them by making several very ingenious toys, kites, and the like.

He was also continually occupied in drawing, and the walls of his room were fairly covered with sketches and pictures made by himself.

Even the muse of poetry he affected ; and, when a man, he loved to look back and recount to his friends that when as yet at Grantham he wrote some pretty verses.

In the year 1656, when fourteen years old, his mother took him home, to help her in the affairs of her farm. But young Newton was positively averse to such things, and preferred the reading of some old book or other, borrowed from a neighbor, the elaboration of a model, the construction of a new wind-mill, and similar occupations, to the drowsy task of tilling the ground. Thus he was often seen walking among the fields with arms folded and mind wandering, while the flock entrusted to his care, being left to itself, had a splendid time destroying fields and meadows and going wherever it pleased. On such an occasion he was found by his uncle, William Aynsough, a minister, sitting behind a hedge, with a treatise on geometry in his hands. This moment de-

cided his whole future ! His uncle persuaded Mrs. Newton to send the boy to Trinity College, Cambridge, convincing her that he was good only for studying.

Newton entered that school on the 5th of June, 1660, at the age of eighteen. The young man, who was destined to remold all science, then touched the first steps to her temple, in order to be at last admitted to her awful presence. Without the advice of learned friends, without even knowing which were the best books, he possessed *less* than the average knowledge when he entered the university. He had spent his time in playing with machines, and had followed only his love for practical experiment ; but it was, perhaps, better that he brought with him none of the prejudice and premature opinions which, though generally false, still, when deeply engraved on the youthful mind, are so difficult to erase in order to make room for sound and correct views.

In this institution Newton's mind was developed more perfectly ; there already he displayed his talent in discovering those three grand truths, which have immortalized his name, viz., about *light*, the *infinitesimal*, and *gravitation*. From the very beginning of his studies he devoted all his attention to mathematics. Euclid was merely read like a novel, and regarded as too easy ! He looked upon the theorems as so many axioms, which are comprehended the moment they are *heard*. Without further preparation he turned immediately to *Descartes'* profound work on geometry ; soon after he took up *Saunderson's Logic*, and then *Kepler's* writings on optics and astronomy. While reading these by no means simple works, he used to make extracts of them, and so fast was his progress in these sciences that his tutor soon declared he could not teach him any more, and that this young man was better fitted to give than to receive advice !

In the next year, 1661, he became subsizes (i. e., a student who waited on the scholars or free students), but not until 1664 a true scholar. In 1665 the degree of Bachelor of Arts was conferred upon him ; two years later he became younger professor, the next year elder professor ; and at last, in 1669, when twenty-seven years old, he was appointed professor of mathematics in the place of the renowned Barrows, who had resigned in favor of Newton. Till 1695, for twenty-six years, he kept that position, after which he was made warden of the mint in London. Four years later he

obtained the presidency of the royal mint, with a yearly income of £15,000, and kept this position till he was carried away by death, on the 20th of March, 1727.

THE RADIOMETER AS A PHOTOMETER.

Though the radiometer, or light-mill, as it is sometimes called, seems to be an instrument of but little practical use, owing to its delicacy, and the difficulty of counting the number of revolutions it makes in a given period of time, it has been advantageously used in photography. Its use depends upon the assumption that the same amount of light always makes it turn the same number of revolutions. Supposing this to be true, we thus have a means for determining the length of time necessary to expose the sensitive plate in order to get the same effect in any kind of weather.

Having placed the radiometer before the camera, surrounded by screens in such a way that the mill receives only those rays which would act upon the plate, we count the number of revolutions (which in this case will be small) which the mill makes during the time of exposure, exactly long enough to get the required result. Knowing this, we let the light act so many seconds as is necessary to give the radiometer the same number of revolutions. The weather being less clear, the velocity of rotation will be less. In this way the number of revolutions remains an exact standard for the quantity of light, entering the camera in more or less seconds.

V. d. W.

Hereafter the New York *Times*, the New York *Herald*, and the STEVENS INDICATOR will be printed on a new kind of profile paper, just out. Only 60c. a dozen sheets. Very cheap, indeed. So cheap that when you want a single sheet all you have to do is to buy a dozen. It only costs fifty-five cents more.

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The editors do not hold themselves responsible for opinions expressed in literary articles or communications.

THE old Board of Editors has just bowed itself off the stage, and the thundering applause has scarcely ceased, when the new Board steps forward to claim attention. But what are we to say to the mighty audience? We might utter a eulogy upon the retiring board. Let that rest. They exalted themselves before the pen passed from their hands. We might launch out into an extravagant statement of what will be accomplished in the next four issues of the INDICATOR; but what are vain boastings? And yet, it is desirable that those assuming a public trust should adopt some creed, some principle of action, in order that all may know what to expect, and arrange their plans accordingly.

The board expects every man to do his duty; and the board intends to see that each man *shall* do his duty. We find the INDICATOR in a prosperous condition. Our every effort shall be to sustain and add to this prosperity.

IT is not at all surprising that in an assemblage of young men representing all types of manhood—or humanity, rather—there should be found some whose actions call forth merited criticism. In view of this fact, therefore, there was nothing unexpected in the appearance, in leading dailies, on consecutive mornings, of two articles upon certain debated questions which are now agitating the college mind. We say such things are not surprising; and yet there is nothing more unnatural than the case of a child forsaking its foster-parent and endeavoring to spread reports derogatory to her character. Thus it is with the student who takes the little motes of dissention floating about in the college atmosphere and places them under a microscope, with a newspaper reporter at the eye-piece, ready to put down what he sees through the glass, and more besides. How much worse, then, is it when the mote assumes more significant dimensions. The magnifying power is the same; what then shall we say of the second object when magnified?

It is hard for us to find words with which to accurately express our contempt for the mean and unnatural spirit which has prompted some of our college mates to pour their little grievances into the reportorial ear. It does not require much thought to see where such a policy will land the college, unless right sentiment is upheld by the college at large. We will wager that the guilty ones in this case are the very students who would shrink from circulating such defamatory reports were they by such deeds rendered liable to ostracism.

WE are pleased to notice the increased interest manifested in our Communication column. To be sure, the letters are mostly all growls, toned down to suit the conservative taste of the editors; still, we look upon this as a sign of better things to come. Already discussions are beginning to creep in, and it cannot now be long before the students will become accustomed to look for these discussions and to take part. Prof. Wall's reci-

show that there are good debaters to be in the Sophomore class, and probably it could be proved of the other classes. At surprise is that '89, after six months of college life, has found nothing to criticize, suggestions to offer. They have shown interest in the college paper; let them the work of producing a periodical to the students.

About time that the bulletin board had been cleaning out. Once more, board-space advertisements have accumulated, some, with several worn-out notices, come to fill the space required for more important matters. As a result, one may see old jagged strips of paper fastened on the side, either with pins or match ends, in the cracks. It is a pity that such a state of affairs should exist, and there is no wonder for it, as the pressure has been relieved by the withdrawal of the INDICATOR and the Association from the struggle. Now the book-list is to be transferred (in more legible form) to the I. P. Co.'s bulletin board; here is still less grounds for the over-crowded state of the college bulletin board.

INDICATOR is at last becoming a necessity in our little college world. Its usefulness is gradually widening, and it is to see in the future journal our aims. It is with pleasure, therefore, that attention to Mr. Pfordte's letter, and suggestion therein contained. The subject has received our careful consideration, and we are now prepared to state our willingness to attempt such a scheme. Of course, if support of the students is not forthcoming, we must abandon the project. At any rate, a plan shall be given the system.

After some deliberation it has been decided to publish a book list upon the bulletin board, to publish, each month, in the columns of the paper, such a list, corrected to date. It is understood that the buyer and seller

are never brought into contact; the seller receives his money, and the buyer his books without either knowing the other's name. We have said "books;" it is not intended to limit the articles exchanged. We will announce, as early as possible, the name of the editor appointed to assist the students in this project.

WE have ventured out of the trodden path of college journalism, and publish in this issue two pages of music and songs. A few words of explanation as to our purpose may not be amiss.

In placing in the hands of the students these songs, the compilers lay but slight claim to authorship of entire pieces, their great aim being to adapt words to familiar tunes, and to obtain original music for songs which have not as yet appeared in music form. As an example of adaptation take the familiar tune, "Eli Yale." It is absurd to go on singing as we have done:

"As Sophomores we have our task.

'Tis best performed with torch and mask."

We do not study the classics; hence are free from the duties of the funeral pyre. Let us take as another illustration "Balada Amoroso." These beautiful words appear in a book published over thirty years ago. There was no music and the editors obtained original music, hoping that the whole might become a college song.

Recollect, we do not presume to publish these songs as "Stevens Songs." We merely place before the students songs which may or may not become popular. We do not guarantee to publish songs every month, but whenever we insert them we will take pains to fill up an even number of pages, so that they may be cut out and pasted in the book of "Students' Songs."

Students having books, instruments or tools to dispose of will do well to advertise them in the "Students' Wants" column. Insertion, giving brief particulars, free. Positively no boarding house notices admitted.

INDICATOR CARD.

During the recent wintry weather the little radiator in the mathematics room has been put to a very severe test. At the close of each hour the windows are opened in order to give the incoming class a chance at whatever fresh air may be wandering like a stranger about the Institute. When the thermometer is at 8° this condition of affairs does not last long, and the windows are closed. Now the question comes: How long is it going to take that little radiator to change fresh air at 8° into fresh air at 65° ? Well, just about forty minutes. To be sure, anything that may be done now in regard to this matter will be of no use this spring, yet it is best that the evil be remedied while we are suffering from its effects.

In this card we wish to mention another matter closely related to the one which has gone before. Some of the rooms are "redolent with humanity" to such a degree as to be either stupefying or nauseating. It matters not whether the air be cold or warm, the odor is the same. Take a room where little attention is paid to ventilation. At 9 a.m. the Freshmen gather and recite until 10, when the Juniors take their places. At eleven, when the Sophs arrive the room smells like a basement beer saloon. How much work can be done in such an atmosphere! We prefer to shiver rather than to be stifled, and if we can't have more steam give us *cold fresh* air rather than *warm foul* air!

COMMUNICATIONS.

To the Editors of the INDICATOR:

Another word in regard to the sketching of machines. Recently I was assigned to a machine in Prof. Wood's room. Upon attempting to take this machine apart, I had recourse to a screwdriver. Naturally, the place where such an article was to be found would be the tool room; so I went thither. The attendant informed me that "there used to be three or four drivers, but now there's only one, and that's lyin' around somewhere." Failing to find this remnant of the glorious past, I applied to Mr. Lackland. He admitted that there was a screwdriver, but that, if found, it would probably be required in the shop.

After wasting the entire drawing period, and after asking various other dignitaries as to the whereabouts of anything bearing any

resemblance to a screwdriver, I gave up in disgust. There was evidently nothing else to do but to write to the INDICATOR. Meanwhile, I am using my chum's jack knife; and if a certain machine shows marks of hard usage, don't blame me, but the missing screwdriver. SOPHOMORE.

To the Editors of the Indicator:

"Tempus fugit." The baseball season is rapidly approaching and on all sides we can hear the prediction that our baseball season this year will be as much of a failure as it was last year. But why should it be? We have the material for a good team, and we have also a captain who will not go home at the beginning of the season and let the team take care of itself. If we fail to make a good record this year it will be the fault of the management. Still there are but two faults every year; the first one is, not arranging enough games to be played on our *own* grounds, the second and principal reason is, that at the beginning of every season we start out by playing against strong clubs, and of course lose our first games. This demoralizes the team for the rest of the season. Now, the only way in which we can expect to make a success this season, is by playing our first games with clubs like the Adelphi's and Polytechnics, and, by winning such games, give the members of the team confidence in themselves so that later on in the season when compelled to meet strong teams, there will be some prospect of winning. COMMON SENSE.

To the Editors of the Indicator:

On reading the Exchange from the *Troy Polytechnic* in the last number the idea struck me as being an excellent one and one which would provide great conveniences for those students who wish to dispose of the old textbooks for which they have no further use.

Your remark at the end of that Exchange convinced me that although you are a grinding monopoly you are still grinding for the interest of the students. The suggestion is a timely one as is sufficiently shown by the frequent notices regarding the purchase of books, at the bulletin board. How some of our worthy Professors will feel if such a scheme should be established in a proper working order I could not exactly tell though if I step on their toes I hope they will pardon it.

Every student, I think, who has acquired a library of college books, feels the burden they

to him besides representing so much capital when no longer used and many be glad to dispose of them at a reasonable price while other students would be accosted, if they were able to obtain them at rates lower than those charged at the book store. Some of the books are used for a few weeks and very few of them more than one term, and after that they are "the fool book in its dusty nook" never to be read except perhaps in a sentimental mood on remembering the old college days ago.

The only real objection that exists, namely a natural aversion which every one feels to get into any business transactions with those who are his friends and companions, can be overcome by making all transactions with a disinterested third party, as the INTERMEDIARY, so that the buyer and seller need never come in contact with each other or even their names.

Do not think, as some have done, that you are going to use every one of your college books when you enter business for you will find that the class of books you may need then are special works according to the business character, and in which you are to improve yourself; the general college books will give comparatively little practical information on those matters of which the most, in fact, are learned in the regular business routine.

I would not be understood to mean that college books will be useless after leaving college. Some of them, as Rankine, Deschanel, are excellent books for reference and should be kept but this each student does best to decide for himself.

Some figures will show what can be gained by a course. Take the average number of books in a class during the four years at forty. Books during four years cost about \$50. Chemical apparatus about \$10.—and the books say \$12.—Total \$72. Suppose that the student would sell only one half of these at 75 per cent. of the original cost then $75 = \$27.00$ which would return to him. The whole class would be $\$27 \times 40 = \1080 ahead for which if they are careful to use it, they may have a fine time at comment and an excellent class dinner. A result like this can scarcely be hoped for. The main idea is practical and advances to the students and should be acted by them.

O. PFORDTE.



"Gentlemen, I have the floor!" All right, keep it, but we've got a first mortgage on it.

"Isn't it the season for college pin designs?" Yes; send us some, but let them be "in colors."

Mr. Denton's lectures to the Senior class are exceedingly practical. Cannot more time be given to them?

The following is the motto given to the Freshmen by one of the professors: "Never put off until to-morrow what you can do next week."

It appears, from a new catalogue of books, that J. Donaldson has written a book on the History of Education. Wonder if it is O. W. J.

PROFESSOR.—"In what form do these minerals crystallize, Miss X.?"

MISS X.—"Rhododendrous!" — *Vassar Miscellany*.

One of Hoboken's children (this is poetical, and refers to a full-grown man) wants to know "how the light is *pushed* through the electric wires."

A famous tenor has injured his voice by having a toothpick lodge in his throat. He probably swallowed the toothpick to give his voice more timbre.—*Exchange*.

The man that fooled with the radiator in the drawing-room got scared so badly when the thing blew up that he hasn't been able to leave his crutches yet.

Catalogue says "Senior year, second term, Marine Engineering." Senior class says "Senior year, second term, fire-works (in colors) and pin wheels."

The gymnasium didn't gym—the rink has been turned into a pugilistic arena, where you pay fifty cents for entrance and see an old button's worth of "manly art."

A few days since Mr. Bristol was treated to a grand mixture of calculus and terrific explosions. The detonations took place at regular intervals behind the radiator, and the effect was charming (to the class).

'87 had heaps of fun the other day, putting sulphuretted hydrogen in '88's class room while they were in to recitation. '87 hasn't had so much fun since their papas took them up to see the Japanese village.

"Chem. lab. imp" found considerable difficulty, the other day, in obeying an order to hang a piece of apparatus up on the floor. He used up nearly his whole intellect on the subject, and then gave it up in disgust.

The Freshmen have instituted the practice of beginning shop work at one o'clock and stopping at four. The idea is a good one, as it gives out of town students an opportunity of getting home in some sort of season.

Prof. Leeds aggravates the Sophs by making liquid compounds in large beakers that look like beer, and have a foam precisely similar. He had'n't better leave any of that lying around after lecture. O. W. J. has a key to that room.

Prof. (to Sophomore Class): "Now, these things are very simple; very simple indeed. Any boy of ten could understand them easily, say nothing of a man of '88" (Three students drop dead and the plaster tumbles off the ceiling.)

It is too bad, isn't it, that the Seniors can't be sober long enough to work in the Physical Lab. They go around asking each other for the temperature of the room in centimetres, and all such things as that. Brace up, '86, and be more intellectual.

It is rumored that the new chemical imp, seen in lectures and recitations for a month or so past, is a rare species of peculiar organism, and it is thought that Prof. L. is fattening him up as an experimental subject when he comes to organic substances.

Last week when one "Prep." told another "Prep." that the main spring of a watch was like "the flowers that bloom in the spring," because it had "nothing to do with the case," a brick block fell on both of them, and the remains have'n't been recovered yet.

The class pin adopted by '89 is a model of good taste and neatness. It was designed by U. H. Hiller, of that class, and consists of a pair of calipers, monkey wrench and hammer crossed, these being interwoven by a piece of metal bearing the letters S. I. T., '89.

A man in '88, known among the sporting fraternity as "Strayed-off," has made himself so proficient in the intricacies of the balk

line game of billiards, that he has sent an unconditional challenge to O. W. J. for a ten-point game, to be finished in three evenings.

One of the newly deduced facts in thermodynamics is, that the work a Dutchman does is proportional to the beer and sausage consumed. The Dutchman is also a perfectly reversible engine, as his work consists in making the very beer and sausages which he consumes.

One of the "Sophs" has revealed some new facts in English history. He tells us some very startling things about Frances Bacon's father and Queen Elizabeth. We don't like to paralyze the public by saying them right out loud. Ask one of the Sophs to whisper them to you.

The S. S. S. has had a successful inaugural, and will prove even more enjoyable this year than formerly, there seeming to be more efficiency at the head of affairs. Why not rechristen these assemblies and let the name convey rather the idea of a specific for the heart and not "THE BLOOD."

"Gentlemen, these border lines must be one-millionth of an inch thick and sixteen thousandths of a gramme of ink must be used to the inch. Also, in lettering, use Gillott's 303 pen, as 304 sometimes makes one thirty thousandth of an inch difference when the ink hasn't a specific gravity of 1.0032463."

We understand that Mr. Bidwell, the photographer, has recently purchased a mansion on Fifth Avenue with the money made from selling class pictures about the Institute. Why, men are standing in line every day to buy them. It's something wonderful the way those pictures sell. It is wonderful, isn't it?

A senior has been going about with his pockets full of "green cheese," and some that has *grown grav*. Its presence was very audible, and the freshmen are speculating as to the probability of this young scientist having test pieces of the moon for analysis preparatory to a thesis on the "Why-for's of Lunar."

The other day, one of the professors excused himself for not appearing until a while after the class had assembled, by saying that he didn't know that the class was on hand because they were so quiet. (Hereafter, gentlemen, make it a point to enter right into a first-class riot, if the Professor is n't present, in coming into recitations.)

A new branch of instruction has been introduced into one of the departments. It is known as the "Grand Monkey Course." The preliminary exercises consist in blowing corks up into the oak supports and letting students climb up after them. This promises to be a very interesting departure and subsequent advancements will be reported as they take place.

Prof. (to student in Description): "Why did you assume a point on an element?"

Student—"I just sorter placed it there accidentally."

Prof.—"A point is like a fly speck. When the fly lit there he did it on purpose, and there wasn't anything accidental about it." (Student has to imitate a fly and do the work all over again.)

Prof.: "Now, gentlemen, you see when I excite this rod, it has an attraction for light, fuzzy substances, even at a considerable distance" (excites the rod and holds it within a few feet of an infinitesimal moustache belonging to one of the class). "See! See! Look at that moustache stand out; it attracts even that." (Gilt edged snicker by the class. Blue lights and tomato cans.)

Student: "Shall we make the diameters of the circles around the points $\frac{2}{84}$ or $\frac{1}{42}$ of an inch?"

Professor: "Make them $\frac{2}{84}$ of an inch in diameter."

Later—professor returning to the subject of diameters: "I should like to have the circles made $\frac{1}{32}$ of an inch in diameter, because that is much smaller than $\frac{2}{84}$ of an inch."

When '89 purloined the furniture from '88's class room, they evidently didn't think of the consequences. The faculty took this performance as an excuse for a "grand bounce" in the Freshman class, and while the faculty were "bouncing" Freshmen, the Sophs. walked around and got their property back again; so '89 was not near so well off as it would have been if it had allowed '88's property to enjoy a sweet repose.

Where, oh where have gone our trusty servants, the James Rumsey and the Weehawken? We miss their fair and graceful outlines plying to and fro. It cannot be that they have sunk, and we know full well that the company would never discontinue to use them until such an event took place. Where, then, have they gone? Some one whispers

"Up the Hudson, 'bucking' ice." Yes, perhaps so. Or, perchance, the United States navy has secured them for gun boats. More probable, perhaps, than the other idea.

It seems that the Freshmen have gotten up a *class* pin, totally disregarding the fact that after much controversy and hard work, a *college* pin was, last year, adopted. This action is certainly not a very loyal one on the part of '89. The *college* pin was adapted for all the classes then existing and for all subsequent classes. The pin is certainly as pretty a one as we could wish to wear and it seems no more than right that each succeeding class should willingly adopt it. If only a few do so, the *college* pin and the object of its existence is lost.

People that live anywhere within ten miles of New York are habitually in a hurry. Hoboken is included in these limits; hence its inhabitants are possessed of the general characteristic. The principle of action is, accordingly, that of taking the shortest road to the desired destination. Now the word *here* is practically synonymous with the word *present*, but the former has but one syllable, while the latter has two; consequently, the natural tendency would be for Hobokenites to use *here* instead of *present*. Therefore it is unreasonable to ask them to violate a natural bias, and a refusal to comply with such a request should not be at all surprising. Silah!

During one of the warm days, before the snow had entirely disappeared, one of the Preps., having wandered from his nurse, began to disport himself by heaving snow balls around promiscuously; but he got a little bit too promiscuous after a while, and caught the Mayor in the ear with a full grown one. The Mayor gave the mystic call and brought out the fire department and the whole police force. It is needless to say that the Prep. was arrested, and he was subsequently fined five dollars. Now is your chance, boys. Shots at Mayor Timken, five dollars each; old fashioned "soakers," eight dollars and a half. No extra charge for wear and tear on the Mayor.

If there ever was a lop-sided combination of guttural expressions it is the German. This is the way one of the typical phrases translates: "The pulley is a, about its, through the, either still standing, or up and down, by the workman, pull-able, middle-point going axis movable, circular, disk."

Now that is evidently meant to tell some-

thing about a pulley, but just what no one but a German can come anywhere near telling, and it's doubtful whether he can on all occasions. When a German wants to say that the father bought a hat, he says, the hat bought the father, which is equivalent in English to saying that the father got "sold," that is, he got cheated in the hat.

'88 is enjoying a very decided improvement in the Literature course. Two or three of Shakespeare's finest plays are being taken up and discussed by the class, each man being required to give his own personal views on the general characteristics of the play and on the character of the various persons represented as well. This tends to make each one consider the subject thoughtfully and carefully, and is certainly much better and far more instructive than being confined to the opinions and criticisms of a single author. The recitations show that every one is taking a genuine interest; and as the same plan is to be adopted with the subsequent authors, the interest will undoubtedly continue, which will not only make it much easier for the students themselves, but for the professor as well.

The coils of the fire hose about the halls do not add to the general effect of the Institute, but the change is much better than the old way of boxing the hose in out-of-the-way rooms, especially as the said hose is really intended for use. Looking at some of the coils, we notice that the hose has hardened in the position it has been cramped in for the last ten years, and in some cases would probably fail if wanted for an emergency. The nozzles are poor, but no matter; so that the insurance company is aware of the presence of hose it is immaterial whether the building burns to the ground or not. It is wonderful what effect the knowledge of there having been an empty fire extinguisher in a ruined house has on the prompt adjustment of insurance.

The other day while the Sophs. were busy carrying their stolen furniture up the front stairs from the Freshmen's room, and while the Freshmen were taking it back via the back stairs, O. W. J. minus his black dog, stood in a dark corner watching. The desire to "see a man" outside was overcome by a greater—that of overawing freshmen. As soon as he settled the question that the chairs were going up the stairs, and that the stairs were stationary, although they seemed to have a rotatory motion, he looked up, and, seeing a string of freshmen, he proceeded to make

note of their names. Next morning there was one name at the top of the list and the rest marked ditto, ditto, etc.; so that to this day he can't affirm whether there was really a string of No. 1 freshmen, or whether it was an optical illusion.

The following small comedy of errors took place in this classic town last week. A student rented a furnished room from Mrs. A. About the same time Mrs. A. had a new range put in the kitchen. Some days later, on visiting a neighbor, Mrs. B., whose cradle had stood in England, the following conversation took place.

Mrs. B. "Well! how do you like your new 'eater?"

Mrs. A. (thinking this might be pure English for boarder) "Oh! he isn't a regular boarder, he just has his room up stairs and takes breakfast with us."

Mrs. B. (looking as if doubting Mrs. A.'s sanity), "I don't know what you're talking about, what do you mean?"

Mrs. A. "Well, I don't know what you mean." The curtain rises and plot is revealed. (Let us hope that Mrs. A. will be satisfied with both her 'eaters.—Eds.)

PERSONALS.

'78.

On Wednesday evening, February 10, Mr. E. P. Thompson, associate editor of *The Electrical World*, was married to Miss Edith Chetwood Coursen, daughter of Ex-Mayor Wm. A. Coursen, of Elizabeth, N. J. The ceremony took place at the bride's home, and an elaborate banquet was served after the wedding reception, at which over 200 guests were present. At a late hour the happy couple departed on an extended bridal tour through the South and West.

'82.

The *Railway Age* has secured the services of Mr. Pierce Butler, M. E., of Louisville, Ky., to visit the manufacturing establishments connected with railway construction and equipment, and to send it notes of all matters of interest which may come under his observation. He will also represent this paper in a business way. Mr. Butler is a graduate of Stevens Institute of Technology, where he received a four years' course of both practical and theoretical engineering. Subsequently he was connected with the mechanical depart-

the Delaware, Lackawanna & Western and then with the Brooks Locomotive having charge of their school for apprentices. Latterly he has been practising profession of mechanical engineer.—*Rail-*

GIBBS is with the Chicago, Milwaukee & St. Paul Ry. Co., Department of Tests, West Milwaukee, Wis.

'83.

FRED is with the Chicago, Milwaukee & St. Paul Ry. Co., Car Dept., West Milwaukee.

'85.

BALDWIN is with Westinghouse, Kerr & Co., steam engine builders, Newark City.

HUSSEY is with the Midland Electric Railway, Omaha, Neb.

NORRIS has a position with Bartlett & Co., engineers and founders, Baltimore, Md.

RENWICK is with Renwick, Aspinwall & Co., Architects, New York City.

BURHORN is draughtsman and assistant-intendant of machinery, with Harri-azier & Co., Sugar Refiners, Philadelphia.

'86.

BIRDSALL has on exhibition a time photographic exposures. The invention uses use of part of an old clock geared to a speed exposer. The rate of speed is regulated by the governing fan of the clock attached.

ENGINEERING NOTES.

THE FORTH BRIDGE.

Forth Bridge, now being built by the British, Great Northern, North Eastern & Midland Railway companies, is of the cantilever or continuous girder system, and commenced in January, 1883. The total length of viaduct included in the contract is £1,600,000 is about $1\frac{1}{2}$ miles, and consists of 2 spans, of 1,700 feet each; 2 spans, of 1,500 feet each; 15 spans, of 168 feet each; and 15 spans, of 25 feet each. Including piers, it is thus one mile of main spans and one mile of viaduct approach. The clearance is 150 feet above high water, and the ends of the great cantilevers are more

than 200 feet higher still. There will be about 45,000 tons of steel in the superstructure of the bridge, and 120,000 cubic yards of masonry in the piers.

The South Queen's ferry main pier consists of a group of four cylindrical piers of masonry and concrete, founded by means of pneumatic caissons on the strong boulder clay constituting the bed of the Forth at this point. Owing to the slope of the clay the caissons required to be sunk to depths varying from about 70 feet to 90 feet below high water. The diameter ranges from 70 feet at the base to 60 feet at low water level, above which the iron skin of the caisson is replaced by a facing of Aberdeen granite. At the base of the caissons is a working chamber of 7 feet in height, supplied with compressed air and electrically lighted, for the men excavating the material. Owing to the extreme hardness of the clay, it was necessary to provide a certain number of spades having hydraulic rams in the handles, which, abutting against the roof of the working chamber, sliced the clay readily. At Inchgarvie similar pneumatic caissons are used for two out of four of the cylindrical piers. Owing to the slope of the rock bottom, it is necessary to cut away as much as 18 feet in thickness of whinstone rock to form a level bench for the pier at 70 feet below high water. The most convenient way of doing this was to convert the base of the pier practically into a great diving bell 70 feet in diameter. Rock drills are provided, and blasting goes on in the compressed air chamber without necessitating the withdrawal of the men.

At North Queensbury the four main piers were built either on dry land or within timber and clay coffer-dams. Above low water the whole of the main piers are built of Arboath masonry in cement faced with Aberdeen granite, and hooped occasionally with 18-inch wrought-iron bands. The cantilever end piers and the viaduct piers are built of rubble, concrete and granite in cement.

It is considered that the chief desiderata in the biggest railway bridge ever proposed to be constructed would be best met by a steel "cantilever" or "continuous-girder" bridge. In the Forth bridge, each span of 1710 feet is made up of two cantilevers, projecting 680 feet, and a central girder connecting the same 350 feet in length. The cantilevers are 343 feet deep over the piers and 40 feet at the ends. The bottom members consist of a pair of tubes tapering in diameter from 12 feet to 5

feet, and spaced 120 feet apart centre to centre at the piers and 31 feet 6 inches at the ends. The top members consist of box lattice girders, tapering in depth from 12 feet to 5 feet, and spaced 33 feet apart at the piers and 22 feet 3 inches at the ends. Each tube has a maximum gross sectional area of 830 square inches, and each girder a maximum net sectional area of 506 square inches. Upon each cylindrical masonry pier is bolted a bed-plate carrying a "skewback," from which spring vertical and diagonal columns and struts. The former are 12 feet in diameter and from 368 to 468 square sectional area; the latter are flattened tubes. Horizontal wind-bracing of lattice girders connect the tubes forming the bottom member of the cantilevers, and similar vertical wind-bracing connects the vertical and diagonal tubes, so that the whole structure is a network of bracing, capable of resisting stresses in any direction and of any attainable severity.

Under the combined stresses resulting from the test road in the worst position and the heaviest hurricane, the maximum stress on the steel will not exceed $7\frac{1}{2}$ tons per square inch on any portion of the structure, and on members subject to great variation in the intensity and character of the stress the maximum will not exceed four tons per square inch. For tubular columns and struts, 34 to 37 tons steel, with an elongation of 17 per cent. in 8 inches, is specified, and for tension members 30 to 33 tons steel, with 20 per cent. of elongation.

In making the tubes, the plates are heated in a gas furnace, and bent hot between dies in a powerful hydraulic press. A slight distortion takes place in cooling, which is corrected by pressing the plates again when cold. After bending, all four edges are planed and the plates built up into a tube. Traveling annular drill frames surrounding the tube, fitted each with ten traversing drills, bore the holes at once through plates, covers, and stiffeners, so that when again fitted in place for erection every piece comes into exact juxtaposition. At the present time, although about 15,000 tons of steel work is on the ground, only the approach viaduct girders and some of the bed-plates of the main spans are erected and riveted up.

The new Croton Aqueduct, now under construction from Croton to Harlem River, will have a maximum of 320,000,000 gallons per day, and will cost, when completed, about \$15,000,000.



The second term is, without doubt, the hardest part of the year for Stevens men. With the exception of a little skating on the meadows and a walk now and then, there is absolutely no means of giving the body that exercise which is so essential for the successful completion of the term's work, and upon which so much of our success in after life depends. Even the walking is rendered dangerous by the accumulation of snow and ice on the sidewalks, making the tramp to Weehawken, even to see the snow-clad top of the "beer tower," anything but pleasant, while at the very thought of taking to the river walk, one feels the wind whistle through his bones or sees his hat scudding toward New York with a speed that would make even the Rumsey blush. How we envy those colleges that are fortunate enough to have some means of preparing their rowing crews, their baseball and lacrosse teams for the season that is now drawing nigh; how they must pity us when they think of catching a ball when the thermometer stands at 10° or of stooping to the school-boy level of throwing snowballs just for the sake of exercise. Well, we live in hopes; we are sure that the Trustees and Alumni Association are at work on a gymnasium that will, some day, surprise us and be worthy of the college and her students. In the meantime we will go on with our athletic meetings, electing officers and captains as usual.

At the regular meeting of the association held last month, the following positions were filled:

President, Morrison, '86; *Vice-President*, Chrisfield, '87; *Corresponding Secretary*, Anderson, '88; *Recording Secretary*, Page, '87; *Capt. of Lacrosse*, Post, '86; *Capt. of Football*, Hart, '87.

Mr. Flack '87 was elected last year as captain of the lacrosse team, but the severe work of the Junior year compelled him to resign. He will, however, play on the team, probably in the position which he has so ably filled heretofore. In selecting Mr. Post as his successor, the association has given evidence of their appreciation of that gentleman's work last year, as well as their faith in his ability to

team to success; we would suggest get his men together as soon as possible have them practice regularly. In only can they hope to succeed.

Following gives the main features of the meeting of Inter-Collegiate Lacrosse Union, held on Saturday, Feb. 20th, in New York:

Officers elect are: A. Gardner, Harvard; R. Mathews, N. Y. University; C. G. Riggs, Princeton, President; and Treasurer; executive committee: L. McK. Garrison, Harvard; J. D. Stevens; A. D. McKelvey, N. Y. University; C. G. Riggs, Princeton.

most important business transacted regular admission of STEVENS into the Union.

Game is to be played with Harvard at New York; Princeton, at Princeton; N. Y. U., at New York.

Game to be arranged later to suit the convenience of the teams.

Following amendment to the rules of the Association was adopted:

"home" team shall select the referee and umpire, and the visiting team the other subject to the consent of both.

Delegates present were: F. Hood, A. D. Stevens; Harvard; H. Hodge, Princeton; J. D. Stevens; R. Mathews, N. Y. U.; W. C. Stevens.

It has been seen that the lacrosse at Stevens is no longer a thing of the past, but has a bright outlook ahead. It is with a great deal of interest that the lacrosse team thus, after only a few years of existence, enters on a level with much older than itself, and in thus doing, the directors do hope that it will receive proper enthusiastic support. Don't let the tough time the Druids had in barely getting Stevens! Get out your sticks and

rather early to speak of football, but be obliged to express our approval of the action of Mr. Hart. He will lose with the fine men, but he has the material in the upper classes for putting in the field a team at the Institute will be proud of. The amount of time at his disposal for next year will enable him to pay more attention to the team than heretofore, and bring them up to the standard of excellence which is so much desired.

Again given the association the credit it is due for the faithful performance of its

duty, it becomes necessary for the INDICATOR, as the representative of the students, to demand an explanation from the Board of Directors for the wilful neglect of theirs. For two weeks prior to the convention of the Inter-collegiate Athletic Association, a notice was on the bulletin board, informing the students when and where it would take place. On Feb. 27, representatives from the principal colleges of the country met at the Fifth Avenue Hotel and elected officers for the ensuing year, while Stevens, although only across the river, allowed this opportunity of securing recognition to pass by unnoticed, seeming to deem it not worth while to send a representative. Who is responsible for this? Where is the zeal that so exercised the Board last Fall, when they took the football team in hand? Had they expended a little of it this time in the right direction, we, too, might be represented among the offices, as Lehigh and Lafayette are now. If our Board do not think it worth while to squander six cents for ferrisage, then the quicker we withdraw from the association the better.



The average salary of a college professor is \$1,530.

Harvard will put a football team in the field next year.

The Yale crew will be composed of almost entirely new men.

There are 31 colored students in the Freshman class at Yale.

Harvard College paid the City of Boston, last year, \$18,000 as taxes.

The Freshman class at Oxford is said to number 610; that at Cambridge 865.

An interesting chess tournament is going on between Yale, Princeton and Columbia.

Manager Mutrie, of the New Yorks, has been selected as the coach of the Columbia College baseball team.

At a Harvard faculty meeting, held Feb. 25, the penalty for cuffing was changed from suspension to expulsion.

The students of Lehigh, Boston School of Technology, and Stevens Institute are advocating the building of dormitories.—*Ex.*

Dartmouth has received a \$4,000 scholarship, on condition that no student who uses tobacco shall receive any benefit from it.

The *Yale Literary Magazine*, the oldest and best known of college periodicals, will celebrate its semi-centennial in its next number.

The Harvard College catalogue states the expenses of a student there to be, at least \$484; economical, \$592; moderate, \$812, and very liberal, \$1,360.

Probably the largest literary prize ever offered is that of \$1,000,000, to be given in 1925 by the Russian Academy for the best work on the life and reign of Alexander I.

The faculty of Cornell has issued the following proclamation: "That, for the present, attendance at recitations and lectures shall be made voluntary for students of all colleges.

Among the excellent articles which appear in the *Troy Polytechnic*, for February, the two on "American Railroads," and "Early Locomotives in America," are especially noticeable.

During President Porter's term of office as President of Yale, the number of instructors has increased from 71 to 114; the students, from 755 to 1,076. The number of books in libraries, from 90,000 to 173,000. Over \$2,500,000 have been given in 15 years.

The indoor winter meeting of the Athletic Association of the Boston School of Technology was held on Feb. 27. The chief interest of the meeting centered in the sparring, in which very little science was shown, it being more of an exhibition of brute force than sparring.

If the several college papers, who seem to take delight in dwelling on the queer things that are done and said by the students of Vassar, would utilize the space thus taken up with extracts from that excellent monthly known as the *Vassar Miscellany*, we are sure that it would prove much more interesting to their readers.

The eleventh annual convention of the Inter-collegiate Athletic Association was held at the Fifth Avenue Hotel, Feb. 27th. Representatives were present from the College of the City of New York, Columbia, Harvard,

Lafayette, Lehigh, Princeton, the University of Michigan, the University of Pennsylvania and Yale. The University of Vermont was added to the list of eighteen colleges, comprising the association. The proposition of holding the games on the grounds of the University of Pennsylvania, offered by the delegates of U. P., was declined with thanks. Owing to the increasing dissatisfaction with the starting of races during the past an amendment to the constitution was made, that "the starter shall be a professional of known integrity and ability." It was decided to hold the games on May 29, in New York city, on the grounds of the Manhattan Athletic Club. Next order of business was election of officers. The following were elected: *President*, R. Ferrice, University of Pennsylvania; *Vice-President*, A. W. McCormick, Lafayette; *Secretary*, Clapp, of Lehigh. E. J. Wendel, of Harvard, and Maurice, of Columbia, were then chosen as the Executive Committee.



TOO SHIFTLESS.

My love's eyes were blue
And my love's heart was true,
As we sailed on the river so calm;
My love's cheeks were red,
And her pretty bowed head
Told me something that caused no alarm.

We were wont thus to float
In my frail little boat,
With the useless oars thrown in the stern;
Now, with rudder-cords grasped
In hands gracefully clasped,
My love waited my story to learn.

"Ivay," I suggest,
As her hand I possess,
"Will you steer for me always like this?
We will float on and on,
Till our journey is done,
And then comes eternity's bliss."

"I will not," she said,
"Steer for you, Master Ned—
I'll refuse you, no matter the cost;
For to me 'tis quite clear,
That a boat will not steer—
Will not steer when its headway is lost."

BALADA AMOROSO.

Music by E. S.

Andante con moto.

SOLO.

1. { To the hum of the flow - ing wa - ters A cav - a - lier Called on
Ere his voice had ful - filled its du - ty He heard a - a sigh, And a

TUTTI.

appassionata cres. poco a poco.

one of earth's fair - est daughters, His song to hear. } His lute's sweet chords thro' air were
la - dy of peer - less beau - ty Stood list - 'ning by. }

dramatico.

ring ing, While he in joy this strain was sing - ing: "Flow on, flow on, thou

Calando.

gold - en riv - er, flow on, flow on, thou shin - ing Gua - dal - quiv - ir!"

2 In her eyes the fond youth is gazing
His soul away;
To his mouth her white hand is raising,
In loving play;
And the maid, though from him offended
Her palm she slips,
Only blushed when the kiss came mended
Upon her lips.
Again the lute's sweet chords were ringing,
Again in joy this strain was singing:
"Flow on, flow on, thou golden river!
Flow on, thou shining Guadalquivir!"

3 Then the hope of his dreams were uttered
With wild delight;
And her heart in its bondage fluttered,
And then took flight.
Lo - g she lay, without thought of moving,
Upon his breast;
And all those who have souls for loving,
May guess the rest.
Once more the lute's sweet chords were ringing,
While maid and youth in joy were singing:
"Flow on, flow on, thou golden river!
Flow on, thou blessed Guadalquivir!"

THE STEVENS MAN.

Music by E. S.

1. The Ste - vens man is a jol - ly good fel-low; His face is white and his whis - kers are yel-low; He
 2. The Ste - vens man is a jol - ly old jok-er; He eu - chre can play and al - so draw-po-ker; He's
 3. The Ste - vens man is a jol - ly old duf-fer; He's not the fel-low hard us-age to suf-fer; Though

nev - er drinks whisky, rum, bran-dy, or gin, Thinks punch is a fol - ly, and grog is a sin; Tho' all
 full of good sto - ries and laugh - a - ble squibs, So droll and so strange that they tic - kle one's ribs; He
 poor folk haven't six-pence, he'll still take their parts; And those that be ail - ing, he'll com-fort their hearts. Each

day at his stu - dy - ne'er goes to bed so-ber; And was born in the jol - ly old month of Oc - to-ber. Oh!
 laughs and all laugh; and, I know 'tis no fa - ble, His friends from his jokes have roll'd under the ta - ble! Oh!
 girl thro' his means finds a lov - er to court her; And he oft gives the hun-gry the loan of a quarter. Oh!

CHORUS.
 The Ste - vens man! the Ste - vens man! a jol - ly good health to the Ste - vens man!

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—OF THE—

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No. 4.

TWO INSTANCES OF RAILROAD GROWTH.

Two immense trunk lines, starting from the Metropolis, and connecting all the chief cities of the Empire State with the West, their roads parallel and their termini the same, are by position powerful rivals. Such are the New York Central and the West Shore Railroads, whose interests have lately been made identical. To one interested in railroading, a comparison of the histories of these two is most instructive.

The West Shore Railroad is, from an engineering point of view, to be considered a masterly piece of workmanship. Leaving out its financial difficulties, it is a triumph of modern skill. Everything was constructed in accordance with true principles of science. The road-bed, heavily ballasted with broken stone, and laid with steel rails weighing sixty-seven pounds to the yard, gave an opportunity to start out with locomotives of the maximum weight and dimensions, which locomotive designers have thus far found practicable for efficient service. With a thorough equipment of systematically classified passenger and freight cars of best construction the road began its career.

On June 4th, 1883, the first division of the railway was opened between New York and Newburg; the remaining four sections were thrown open, one after the other, and the beginning of the next year found the entire road in running order. The New York terminal stations, however, were not completed, and it was not until June 21st, 1885, that the entire railroad was open, and independent of all other lines. Starting out, as it did, with its almost perfect roadway and rolling stock, it stands out in strong contrast with the other road, whose history is half a century older and whose growth has been more laborious.

The New York Central Railroad, although the larger and richer, is still, on the whole, a road inferior to the West Shore. Its early history wears almost an ancient aspect when viewed with eyes that have seen the other

from infancy to perfection in two or

three years. Most trunk lines have been formed by the gradual absorption or union of lesser railroads into one great mainway. The New York Central is an instance of this kind. Of the history of one of its parts, the Hudson and Mohawk, we find some interesting facts, in a scientific work published in 1835. The Hudson & Mohawk Railroad Company was incorporated by the Legislature of New York in 1826. On August 2d, 1830, the ground was broken at Schenectady for the purpose of commencing the construction of the road, which was carried on in the following manner:

After the leveling was finished, under each line of rails square holes were dug at the distance of three feet from centre to centre, capable of containing nine cubic feet of broken stone. Into these the broken stone was thrown and rammed down; on this foundation, stone blocks, dressed on the upper side only, were placed. The next step was to drill holes in the face of the stone. In these drillings small plugs of locust wood, about four inches long and an inch in diameter, were loosely placed. Into these plugs were driven the iron spikes which held down the cast iron chairs; these chairs were double or single. The double chairs were of sufficient length to pass across beneath the rail, and were used in the proportion of one to three single chairs, which were on each side of the rail, but did not pass under it.

The rails of the track were composed of plate iron laid on yellow pine stringers. The stringer timbers were about twenty feet long and six inches square, and were placed in the iron chairs, wedged with wooden wedges on the outside into a true line. The wrought iron rails were strips, two and a half inches at the bottom, and rounded off to seven-eighths on the top; their thickness was nine-sixteenths of an inch. These bars were tongued and grooved, and were secured to the wooden stringers by iron spikes driven through oval openings, to provide for expansion and contraction of the metal. At the distance of twenty feet, tie pieces as a security, were laid down to bind the rails together and to keep them in their proper position.

The railroad was operated at first by horse power, and grades were overcome by inclined planes at different points along the route, up which the cars were hauled by stationary engines. The passenger coaches were hung on through braces, like a stage coach, and rode with comparative smoothness. Two locomotives were put on soon after; one of them an English engine, and one of American manufacture. The latter was built in New York, by the West Point Foundry Association, and was quite light, weighing six tons. The English engine weighed eight tons, and was carried on four wheels, connected and placed close together, according to the prevailing idea that this was necessary in order to facilitate the motion around curves. A locomotive with a leading truck, was built and placed upon the road in 1832, which gave better satisfaction.

Other links in the railroad were built at intervals of from two to three years, until, in about 1845, the line was complete, with the exception of gaps between the different roads composing the line. All the roads were then operated by steam, but the running time was, with the frequent change of cars, very slow. Trains running from Albany to Buffalo would travel all day, stop at Syracuse over night, and finish the journey the next day. In summer, two daily trains were run each way, but in winter only one daily train each way.

In the year 1849 an entire revolution in the mode of travel took place. The different railway companies on the line united their tracks, took up the thin bar rail and put down a uniform T rail. New locomotives and improved saloon cars, or long cars seating thirty or forty persons, were put on the track, and the trains began to run at a regular speed. The several railroads between Albany and Buffalo, being thirteen distinct corporations, were consolidated, in 1853, to form the New York Central Railroad, which was afterwards incorporated with the Hudson River Railroad, and thus the through line was completed.

ALBITAN.

FATE OF THE "STEVENS BATTERY."

If any of the millionaires who are owners of the new Queen Anne Cottages at Babylon, Bay Shore, or some of the other summer resorts on Long Island, were to be told that their handsome wood-work finishings are merely remnants of the old "Stevens Battery" the statement would probably be received with many

doubts. Yet such is the fact. A few remarks on the dimensions and general appearance of the vessel will probably not be amiss.

Length over all.....	401 feet.
Length between perpendiculars...	390 "
Breadth.....	45 "
Breadth over armor.....	54 "
Depth to main deck.....	24½ "
Draught maximum, fore and aft....	22 "
Displacement at 22 ft. draught, 6,006.02 tons.	
Area of immersed midship section, 890.26 sq. ft.	
Ratio of immersed midship section to circumscribed parallelogram..	0.867
Ratio of displacement to circumscribing parallelopiped.....	0.544
Number of steam cylinders..	4
Diameter.....	72 inch.
Stroke of piston.....	43 "
Number of screw propellers.....	2
Diameter ".....	18 sq. ft.
Pitch ".....	27 "
Number of boilers.....	10
Area of heating surface.....	28,000 sq. ft.
Area of grate surface.....	876 "

The general appearance of the vessel, if completed as Professor Thurston recommended, would have been of a monitor iron-clad. The proportion of length to breadth, 8.666 to 1, is that now usually observed in sea-going, high-powered steamers, and is somewhat less than in those which represented the extreme limit yet attained.

The lines are fair and fine, giving a sharp bow, and the fine run, which is essential to the efficient working of screw propellers. The proportion of the midship section which has a breadth equal very nearly to double the intended draught, were such as are best calculated to make the vessel easy in a sea-way. Seven transverse bulkheads were built, dividing the ship into distinct water-tight compartments. Two additional ones were carried across the ship below the berth-deck. Coal bunker bulkheads forward and aft, and several smaller ones in the extreme ends of the vessel still further strengthened the structure. The hull was made still stronger by the bulkheads of the turret chamber, which stiffened the whole structure by tying the decks, the coal-bunkers, and the lower longitudinal bulkheads firmly together. When Mr. Stevens presented the famous vessel to the State of New Jersey the United States Government decided that a man-of-war could not be accepted as the individual property of any State. Mr. Stevens then offered it to the National Government, but it was refused as being inadequate to perform the duties required of a war ship. Several suits followed this decision between the estate of Mr. Stevens and the

f New Jersey, which claimed that al-
it could not hold the vessel it was en-
its value in money. The final decis-
in favor of the State, and the "Stevens
," as it stood on the ways, was sold to
J. Laimbeer, of New York City, for
\$. The heirs of Mr. Stevens say that
t over \$2,000,000 upon his pet object
ion to \$500,000 allowed by the Govern-
In his will was a codicil ordering the
iture of \$1,200,000, making the total
the vessel \$3,700,000. Mr. Laimbeer
en six months to remove his purchase,
half of that time he turned it over to
Stevens Institute of Technology for the
ts students. In consequence, Prof. R.
rston was able to give his pupils three
of the most interesting practical study
s ever been available in this part of the

dismantling of the hull occupied the
of the time allotted to the purchaser.
day during this period were there less
men at work, while at times the number
to 100. The wood-work was all found
f the finest Georgia pine in high state
ervation. That used in the sides of
l was in layers to the thickness of 5 ft.
These layers were dovetailed together
ured by bolts 4 ft. long. In and
these joinings cresote was packed in
uantities, and, although this wood had
a place for more than 20 years, it was
to be in better condition than when
cut. All the skill of the workmen and
ength of tools could not force the
of wood apart and the work was finally
y burning. It was found to be exceed-
ry and susceptible of high polish, and, as
n stated, a large quantity of it has been
the new cottages built and building on
th shore of Long Island. From the hold
ken two engines of 6,000 horse-power
ade expressly for use in a twin screw
and, therefore, worthless. These were
up and sold to the Delamater Iron
from whence they came. In addition
two propelling engines, there were six-
iving engines which were preserved
nd taken to the coal mines in Penn-
a, where they are still used as superior
ew inventions. Over 2,000 tons of iron
ere taken from the vessel and sold to
aissagua Iron Works, in Pennsylvania,
% of it was rolled in this country.
alance was sent abroad. The bolts
n the construction of this vessel were

made in Scotland for that purpose and
possessed unusual tensile qualities. These
were in good condition after their long years
of service and were shipped to England, where
they were used in the manufacture of shot-
gun barrels. When all the movable articles
had been carted away the two pointed ends of
the boat were chopped off and the immense
hull parted with its own weight. The labor
of collecting the remnants was then compara-
tively easy. Immense quantities of giant powder
were used, however, to reduce the bulk of the
iron to a mass small enough to be carted
away. There remains intact to-day but one
article that was used on board the "Stevens
Iron-clad Battery." It is a large bronze bell
4 ft. in circumference and hangs in the tower
of a school-house in Tenaflly, New Jersey.

OBELISKS; FROM AN ENGINEERING STAND-POINT.

PAPER III.—ERECTION.

It may, perhaps, be rather disappointing to
my readers if, at the very beginning of this
paper, I tell them that, as to the method of
erection we *know absolutely nothing*. The an-
cient writers record, indeed, the facts, but en-
ter into no detail, praise no engineering gen-
ius. In their strange blendings of truth and
tradition they had no place for critical de-
scription of any sort. Worse even than this;
we may inspect all known hieroglyphs, and
nowhere will we be able to find any record
left by their authors, in regard to methods of
erection. It therefore goes without saying,
that whatever statements I may advance in
the course of this paper will be based upon
the various hypotheses alone.

There is a peculiar notion in the popular
mind that the Egyptians accomplished all
their great works by sheer man-power. This
is but partially true, as I shall show hereafter.
I wish now to speak of the man-power. Among
the Egyptians, only convicts and slaves were
obliged to act as beasts of burden. The race
was too highly educated—I speak advisedly—
to be put to such work. Even the slaves, in
the light of this great civilization, were fitted
for better positions. Inheritance is a great
factor in science or art, and a man whose fore-
fathers, for generations, have pursued one oc-
cupation, is eminently well qualified to adopt
the same calling. Thus, even in the poorest
classes, sculpture and engineering were not

unknown; and, from the middle classes, Egypt produced sculptors and engineers—the best of the latter the world has ever seen. We see, now, that when we speak of man-power, we refer to convict labor. It is not hard to show that machines must have been used in connection with this convict labor. A contradictory supposition has, however, been advanced. Let us first dispose of that. Sharpe, in his “History of Egypt,” attempts an explanation, as follows:

“The obelisk was placed in a horizontal position, so that its foot rested upon the edge of the pedestal; in the latter a groove was cut. Next, the obelisk was turned upon this groove as an axis, its foot resting in the groove. This raising process was accomplished by building a mound under its head.” Obviously enough, the question is, *How to build that mound?* Recollect, nothing has been said concerning lifting jacks. I leave this weak attempt at explanation to pass for what it is worth.

Numerous as are the speculations upon the subject, not one of them is supported by evidence. In fact, there is no other evidence than this: *From a careful examination of the length of time involved in obelisk erection (as given in their own records), the obelisks could not have been put in place in the stated time, unless the application of power, involved in the execution of the work, was at least equal to any modern application of mechanical force.* Now, since the ancients had only men and oxen to furnish the requisite force, it follows that machines were used; and in all probability, these were derricks, the Egyptians being quite well acquainted with the use of the pulley-block.

It can now be laid down as a probable, and almost necessary supposition, that the obelisks were erected by derricks, the power being furnished by gangs of men. But how, it is immediately asked, did the derricks take up the obelisks? Another disputed point! One says that a groove was used, as before mentioned, and the derrick substituted for the mound of earth. Another says, that Commander Goringe, in erecting the “Needle” in Central Park, only copied the ancient method, *i. e.*, an inclined plane, up which the stone was drawn bottom first, and then tilted into place by means of trunnions. I think we may readily allow both of these methods, since there is nothing whatever to show in opposition to them. As an interesting fact, I will state that one or more obelisks have been found erected in a court-yard, whose limited area precludes the use of an inclined plane, and which is

known to have been in position before the obelisk was erected.

I have tried to show how little can be said concerning the erection of obelisks. In my paper on Quarrying, I adduced testimony from modern methods employed in ancient countries. This plan was tried with less result in the second paper; and in this, the third, there are no sources from which to draw the suggestions which we so much desire. The reason for this is apparent. As we unravel the mystery, we become more and more bewildered by the speed with which the range of circumstances attending the erections outstrips the increase of knowledge on the subject. If we could turn to India, and there find, in the nineteenth century, methods of erection which had been used from time immemorial, we might naturally conclude that the problem before us had been solved. But unfortunately this is impossible, and so we find the theories which we have deemed most worthy of belief forever dashed from our hands and the destroyers can point to nothing which will in any way assist us in the adoption of true theories. The critic is ever ready to cast down, but seldom to build up.

Let me say, then, in closing this subject, which I hope may have proved interesting to at least a few of my readers, that there is one great difficulty encountered by the scientific student groping in the dust of past ages. It is this. He is not prepared to hear his neighbor say: “That specimen is valueless; throw it away!” and so he clings tenaciously to his theory, crying: “Show me a better, and I will throw this away.” But oftentimes his supposed treasure is torn from him, and he cries out despairingly: “You have stolen my treasure; what do you offer in return!” Only the truest of the brave explorers pass with undiminished ardor through this crisis. CHIC.

ELEMENTARY BLOW-PIPE ANALYSIS.

VI.

The elements which are detected in the last group are mainly the metals—gold, silver, copper, tin, lead, bismuth and antimony. These are determined as metals, and barium, strontium, calcium, magnesium and aluminium, which are determined as oxides. The test for sulphuric acid also comes in this group.

The additional apparatus required are a small hammer and a piece of polished steel to

on an anvil, in order to test the malleability or brittleness of the metallic beads. Soda or sodium carbonate will be used as a reagent. Powder the test substance, a small quantity upon the palm of the hand mix with twice the volume of powdered charcoal moistening the entire mass, so as to form a thick dough. This is placed in a small cavity on the charcoal and heated with the reducing flame. At first blow rather gently, to drive off the water which was used to prevent the powder from being blown away by the blast.

Soda will form a slag with the foreign elements combined with the elements, and, if the slag is fluid, will draw into the charcoal, the metallic bead upon the surface.

If the slag be very thick, a little more soda may be added, which will aid in the reduction and allow the small particles of the metal to sink to the bottom of the cavity and form into a globule. In some cases, as with copper and tin, the small metallic particles combine only with great difficulty into a globule but remain scattered in the slag.

When this occurs the slag, with a portion of the charcoal, should be cut out, powdered in an agate mortar, stirred up with water, and the lighter particles poured off with the water. This is repeated until the small metallic disks are seen and recognized at the bottom of the mortar. If necessary, they may be combined into a large globule by adding a little soda on charcoal.

It is of course, understood that gold, silver, copper, and platinum require a hotter flame than the other elements for reducing or remelting. The metals of this group in most of their compounds are reduced by the action of charcoal and the reducing flame alone, as has been shown in the incrustation group. In a very few exceptions, the metals are obtained from all their compounds, either natural or artificial, by the aid of soda, while the others, when they occur, may be treated with potassium cyanide instead of soda.

The method of obtaining the metallic beads is the same with all the metals, and they are then distinguished from each other by their physical properties, as color, malleability, brittleness and fusibility. If these are fully satisfactory, a few simple chemical tests may be performed.

Gold is yellow in color, malleable, and fuses at a cherry red. **Silver** has a silver-white color, malleable, and fuses at light red heat. It may be mistaken for tin, especially if the

bead is small. Dissolve a part of the bead in nitric acid, dilute it and add a drop of hydrochloric acid or a solution of common salt. A thick white precipitate of silver chloride indicates the presence of silver. **Copper** is very easily recognized by its red color, malleability and fusion at red heat. **Tin** is white, malleable, and fuses below red heat. It may be mistaken for silver. Apply the incrustation test with cobalt-nitrate solution. **Lead** is easily known by its lead-gray color, malleability and low point of fusion. In case of doubt apply the incrustation test with sulphur and potassium iodide.

Bismuth is yellowish-white in color, brittle and fuses below red heat; the incrustation test given under lead may be applied.

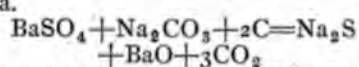
Antimony is white, brittle, and fuses below red heat. The bead, if heated to redness, will remain red for quite some time after it has been removed from the flame, and will become covered with a thick layer of crystals of antimony oxide which often covers the entire bead. The corresponding incrustation will also be observed.

If the test substance is one of the alkaline earths, which are generally white in color, the soda will form a fusible slag with the oxides of aluminium, strontium and magnesium which will draw into the charcoal; but with calcium and barium oxides the soda does not combine, and will, therefore, remain on the surface of the charcoal while the soda draws in. By this method traces of calcium and barium may be detected in a mixture containing also the other earths. When strontium, barium or calcium is suspected, the flame color test should be applied to a fresh portion of the substance. If aluminium, magnesium or calcium is supposed to be present, a fresh part of the substance should be heated to nearly white heat, after cooling, moistened with the cobalt-nitrate solution and again heated to nearly white heat for some time.

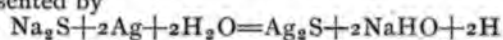
The presence of *aluminium* will be indicated by a blue color throughout the test-piece. If *magnesium* is present it is shown by a very delicate pink color which often cannot be recognized distinctly unless compared with some white article, most conveniently a sheet of white paper. *Calcium* is recognized by a gray color.

The test for *sulphuric acid* is made by mixing the moist powdered substance with twice its bulk of soda, and heating with a good reducing flame. This causes the mixture to draw into the charcoal; it is then cut out,

crushed upon a piece of sheet silver or a silver coin and moistened with water. A black or brownish-black spot upon the silver will indicate the presence of sulphuric acid in the original test-piece. The reactions taking place on the charcoal are represented by the formula.



Those taking place on the silver are represented by



This test is a very delicate one and very minute traces of sulphuric acid can be detected by it, therefore common illuminating gas should never be used in making this test, as it almost always contains sulphuric acid which produces a very distinct reaction. O. PF.

(To be concluded.)

AERIAL NAVIGATION.

It has been often said, that we are living in an age of progress, in a century of inventions. To show how far we are justified in calling it thus, would be futile; besides, history shows us that almost every age was modest enough to claim that appellation—no era whatsoever would have desired to be called an age of retrogression.

Apart from this, we find our age specially occupied with the investigation of certain laws, forces or objects, all of which are not yet fully understood. Our century, for this reason, is indeed an age of research. The mind of man in general has become active; every one is now thinking and working for himself, while our great philosophers and scientists are puzzling over unsolved problems to benefit the human race.

Among these problems, which are gradually being solved, is that of manageable aerostation. The prospect of sailing upon the air, and subduing the winds themselves; to rival the flight of birds; to rise with safety nearer to the clouds, and look down upon that diminutive creation below, where individual man, with his limited knowledge and with his unbounded fancy, is altogether lost; the ambition to spurn our "old mother earth," and to defy her bond, the law of gravitation; these anticipations and such as these are sufficient to fire the mind of even the dullest and to make him long for a perfect knowledge of aerial navigation.

And, indeed, what man cannot accomplish in reality, he at least imagines in his creative

mind. In ancient times man dreamed of successfully passing through the air; we read of poets ascending to the clouds on the back of the winged horse Pegasus; of deities flying or walking through the air.

The middle ages, again, with their fantastic beliefs, invest their angels and demons with wings. All, however, think of flight chiefly as something supernatural and unattainable by man; they give vent to their unsatisfied desire in this indirect way.

Some exceptionally daring minds meditated on the construction of wings, naturally choosing those of the birds as their models. Thus we find Daidalos of Athens, the famous builder of the Cretan labyrinth, occupying his time, during exile, in making wings for himself and for his son. He is said to have succeeded; but, although the manner in which he constructed his machines with the feathers of birds has been minutely described, no man in later times was able to attain equal success! Iron had also been tried, but it proved too heavy; and several inventors paid as martyrs (?) of science, with their lives, the daring with which they trusted themselves to their deceitful inventions.

At last, in 1782, the Montgolfier Brothers constructed the first balloon. Man thinks his dream is realized; he imagines himself, now, endowed with the power of sailing through the air! He, the lord of the earth and of the water, has also conquered the air!

The great philosophers of the time set themselves at work; different gases are used for filling the balloon; now heated air, now hydrogen, and later coal gas; rudders, paddle wheels, sails, oars, wings, and even steam engines are placed on board and tried. Men like Rozier, Charles Gay Lussac, entrust their lives to the inconstant air, more fickle than the water, and they ascend to the enormous height of twenty-three thousand (23,000) feet.

In our own country, we even find balloon companies organizing. One of these, the "Aerial Navigation Company," was started in New York, in 1834. The prospectus of this corporation had a minute description of the machine: it stated that the ship was to be made to carry twenty thousand (20,000) pounds of passengers and freight; that a voyage from New York to London would be made *against* all obstacles in six (6) days, and with everything *in its favor* in less than one (1) day!—But what has become of this Company?

However, the excitement has not yet fully subsided. Who can describe the feeling of

ation that fills our breast when we gaze
d to watch the flight of the balloon !
e are unsatisfied with this display of our
fect powers.

seems to be the mockery of heaven ! We
e but a taste of flying, and wish the more
as free as the birds in the region of the
We are at the mercy of capricious
; it is they, on which the direction of
ght depends. Man, tired of this dis-
tment relinquishes all hope of ever see-
; favorite dream realized. In the mean-
various scientists, inventors and me-
s are toiling away in the dark recesses
work-shop ; now and then the light of
rious outside world is allowed to find
y into the sanctuary. Then there passes
h the journals a pulsation ; some person
heard of before has invented a flying
ne—its construction is *almost* completed ;
we hear that " Prof. Tissandier, in Paris,
st began the building of an electric
n with which he will sail around Paris,"
t Monsieur Renard has accomplished
eat feat of sailing against a strong wind.
all is quiet again until some other
ne is said to occupy some other person's

thus from day to day we are encour-
o expect, at some *future* time, a com-
manageable machine for navigation in

ether this age shall yet see a successful
ion of this sort cannot be foretold. Let
e, however, that when the nineteenth
y has run its course, it will have added
achievements with which it is already
ed, that precious victory of man over
nds.

PECTION TOURS, CLASS OF '86.

ng to press of other work during exam-
t, we have been unable to get ready an
it of the inspection tours of '86. On
9, about thirty members of the class
Bethlehem. To chronicle the fun
take a column of our paper. To
cle the work, we would have to issue a
ment. The Eastern trip will be next
programme, and we hope to give in
ay number an account of both excur-

A SAW WITHOUT TEETH.

A saw without teeth, that will cut a steel
rail in two minutes, is in operation at the Cen-
tral Hudson shops in Greenbush, N. Y. The
saw is run by a ninety horse-power engine,
more power than is required to run all the
other machinery in the shops, and is thirty-
eight inches in diameter, and three-eighths of
an inch thick at the edge. The disk is made
of Bessemer steel, and runs at a very high rate
of speed. While in operation a band of fire
encircles the saw, and the many sparks flying
from the revolving disk resemble a display of
pyrotechnics. To keep the saw cool and pre-
vent it from cracking, a tank of water is placed
above the machine, from which a small stream
runs down and drops on the saw while in mo-
tion. By this plan one saw will cut nearly
3,000 rails before it is worn out. A steel rail,
after about six years' constant use, becomes
battered at the ends, and by cutting them off
the rails can be used in branch and switch
tracks. Rails are cut by this machine for the
whole line of the Central Hudson Railroad.
The saw, while cutting, bears down hard on
the rail, the end of which is left as smooth as
the bottom of a flat-iron. One remarkable
thing about the machine is, that the chips cut
from the rail fly back under the saw with such
force as to form a solid piece of steel nearly
as firm as the rail itself.

GEORGE WESTINGHOUSE.

George Westinghouse owes his great and
rapidly increasing wealth to his inventive
genius. Twenty years ago he was a poor
young man, but he struck it rich in his air
brake for railroads, and money has since
flowed into his coffers in a golden stream. He
is one of the most prolific inventors of the
age, and has enough good mechanical ideas to
furnish every manufacturing establishment in
Pittsburgh with successful specialties. He is
not only highly skilled in theoretical and
practical mechanics, but is also a thorough
electrician. He expends an ordinary fortune
every year in experiments necessary to the
perfection of his inventions. By warrant of
the King of Belgium he is entitled to the title
of Sir George Westinghouse, having been
knighted by that monarch as a recognition of
his services to the world as an inventor. He
is a native of New York State, and is about
40 years old.—*N. Y. Sun.*

The Stevens Indicator.

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ALUMNI; ATTENTION!

WE are surprised and disappointed at the action taken by the Executive Committee of the alumni in regard to the INDICATOR. If we are rightly informed, the decision not to support the paper is due to the fact that the editors are neither chosen by the college at large nor by the classes, but by a stock company. Without rehearsing the difficulties under which the editors of the old regime labored, it may be well to state here why and by whom the stock company was formed.

To begin with, the INDICATOR PUBLISHING Co. was formed because even the *editors* under the old rule did not properly attend to their work, and it was considered desirable that when a man was elected to such a position he should bring with him a guarantee of good faith. The sum of five dollars was settled upon by the incorporators as a proper guarantee, since a person who has invested money in

a venture is pretty sure to be interested in the success of the venture.

In the second place, it was moved and carried at the college meeting—convened for the purpose of taking action on the resignation of the last board appointed by the college—that the chairman of the meeting appoint seven men to *form a stock company* and draw up a constitution. This answers the second question.

It has ever been far from our purpose to antagonize the alumni; and now that they have taken formal action upon the matter we are anxious to come to an understanding which will give us the support of those to whom we should naturally look for encouragement. We know that dissatisfaction has been expressed with the basis upon which our paper is conducted. Therefore, we most *earnestly* appeal to those alumni who have this college venture at heart, that they will send us letters upon the subject, expressing freely their opinions. These communications we will publish. It will be interesting to hear the different plans of action proposed. THE INDICATOR PUBLISHING Co. stands ready to go half way toward the alumni in any scheme that they may offer.

One more statement before we drop the pen. The company will appoint a committee to confer with a similar committee from the alumni, the number of men and the time to be decided by the latter. We consider a conference necessary because those who have labored upon the spot will be able to give the older men the peculiarities of the requirements which, in a scientific school, differ so widely from those in a school of arts. Let us hear from the alumni!

AGAIN it becomes necessary to criticise severely the conduct of a certain few students (who call themselves gentlemen). We allude to those students who sit upon the Institute steps, and by their disgraceful conduct tend to bring our College into disrepute. Two or three thoughtless or reckless fellows

his behavior, determine the public
 the morals of the college. It is a
 ted on all sides, that students living
 re guilty of conduct in Hoboken
 would carefully avoid elsewhere.
 ie townspeople are partly blamable
 n that they appear at all times
 c to the college. However that be
 excuse the students. A gentleman
 a gentleman everywhere. If it be
 an assemblage of over two hun-
 ; men there will surely be found one
 o are not gentlemen, we answer :
 t be able to make a man a gentle-
 rt, but we can at least make him a
 in appearances ; and for this pur-
 ll to our aid public opinion. Let
 ve no more attempts to attract the
 f every lady passer-by. And above
 young ladies have a chance to gaze
 eautiful buildings and the enthusi-
 se players without the slightest fear
 sulted from the Institute steps.

INDICATOR CARDS.

catalogue has appeared, much be-
 ual time. At first glance one can
 : or no change in the contents ; and
 are several noteworthy deviations
 old order of things. Upon the
 e, and filling the place made vacant
 h of Mr. Shippen, is the name of
 ton, Ph. D. This is manifestly as
 e ; it is fitting that our President
 trustee of the institution to which
 n so much of his money and valu-
 On the opposite page, in the old
 was a clause relating to lectures on
 ineering ; this clause has entirely
 l from the last issue. We are sorry
 ranch has been formally dropped
 ource ; but it is better thus than
 uld remain a dead letter in the

ly note some of the other changes :
 .uction of the study of Spanish in
 888, taking the place of French,
 from that time be required for en-
 Belles-Lettres, in addition to Shaw,
 f Chaucer, Shakespere, Bacon and

Milton. The announcement of the decision not to found a separate course of electrical engineering, but to incorporate electricity into the present course.

Those students who use the library for a lunch-room will do well to keep out of the way of the irate senior when he consults the ponderous and musty tomes with which our library abounds. It is disagreeable, if not disgusting, to be obliged to handle a book whose cover and pages alike are smeared with butter, cheese, and even jelly. To the thoughtless student who mumbles his mid-day meal while poring lazily over some valuable book, it is the height of enjoyment; but to those who come after him it is a destroyer of religious principles and an unnecessary display of filth. Fie! even the "preps" know better than to act thus.

It is about time that new erasers were provided for the black-boards in some of the recitation rooms. There are two principal reasons why such action should be taken. One is, because the efficiency of a block of wood rubbed upon a pine board is very small as regards erasing power; and the other is, because the noise produced seriously interferes with the progress of the recitations. We notice that there are at least three varieties of chalk in use throughout the building. One grade, a peculiarly soapy variety, has gained our preference owing to the ease with which it may be erased, leaving a uniformly shaded surface for fresh use.

COMMUNICATIONS.

To the Editors of the Indicator :

Looking over the work of the lacrosse team of last year, one can easily see that one of the main reasons for the poor showing it made in the league was lack of team practice, for in the beginning we were almost nothing in the lacrosse world ; but after we had played a number of games in which we were in earnest and did our best, we proved no despicable opponents to the Druids even. Any amount of *individual* practice will not make a *team* that can hope to compete with teams who continually, and from the earliest opportunity, take all the team practice possible. It is true that we have not as many players and have a very large amount of work to perform but that is no excuse for the ones who

are not working to stay away from practice, as is often the case. We have not the players to practice the team as a whole; but we must do the next best thing and divide it, which will give the required thing to a great degree. Another great fault of ours is *individual* playing. Although this is very pretty it is not effectual, and all authorities on the subject cannot condemn it too severely.

There is no saying what we cannot do this year against our older opponents. Judging from the playing at the tournament we ought to beat our old enemy, Princeton. We have on our team some of the best players in the college world, and ought to try the best to show up in this game as it is the only chance of making a first-class standing with our big rivals. There are more practising for the team this year than ever before and it is to be hoped that it will be hard enough work getting on the team to make the players get in trim for playing; and if, in selecting the team, the captain insists on this, that as far as possible the players be in fighting order, it will do much to elevate the standard of our team. It is to be hoped that all of these hints will do some good and that the proper spirit will be shown by all, and in this way insure success to Stevens.

PLAYER.

To the Editors of the Indicator:

"The High School must go" has been heard so often that it may be a matter of curiosity in some minds as to whether there are any reasons why it should not go; and fairness requires that such reasons be duly considered, if any conditions do exist that go to counterbalance certain annoyances so frequently mentioned.

As a preliminary, the High School has the right to stay, owning the property it occupies, and does not exist in its present position by sufferance of the Institute. The first "High School must go" editorial was written in an editorial room belonging to the High School; so little was this understood that when the growth of the school required that it should occupy that room, the editors thought only of the opportunity to get in another "dig" at the school.

It is hardly worth while to suppose, even as a basis for a sarcastic remark, that the gentlemen raising the cry are prepared to make the deficiency good, to be caused by the loss of some thousands of dollars now annually paid into the general fund of the Institute from the

surplus of the High School. This point needs no discussion. Every student in the school pays far more in proportion for his tuition than any student in the Institute.

The causes for the cry appear to be as follows: 1, noise about the building; 2, monopoly of the rear Campus, and 3, occasional intrusion with Institute halls. Of these, the first and second constitute a grievance that cannot be avoided under present circumstances, occasionally becoming a genuine nuisance; but they never last more than one hour and a half in the day, most of that time being "off hours" in the Institute. The third mentioned has been specially prohibited by Prof. Wall, who takes pains to enforce the prohibition.

It would appear that a mere desire to say something was the cause for certain flings at the appearance and behavior of High School students, who come from the best families of Northern New Jersey, some of the best men in the Institute having passed through the school.

The High School is the best feeder the Institute has, sending nearly seventy members into '86, '87, '88 and '89. Among the twenty-nine freshmen included in this number, are found about all those at or near the head of the class; of the five freshmen who fell in the first general engagement with the enemy (in December), but one was from the High School, (a fact surprising to those who know what sort of students some of the twenty-nine were, in the school).

Those whom the school sends up are most patriotic and enthusiastic for the Institute, (so much so that some of them think they must join in the "must go" cry). Especially is this seen in athletics; and no contest occurs in which Stevens takes part, without the presence of High School boys, many of whom thus pay more toward the support of the Athletic Association than members of that association itself regularly do. A far sighted policy on the part of the captains of the various Institute teams would encourage in every way the teams in the school. Nine of the freshmen players in class foot-ball games, last fall, were from the school. As it is, the school receives some special favors; last spring the school nine had the use of the cricket grounds once—on a Saturday morning—the St. George's also giving the use of the grounds once, and last fall three games were played there by the school eleven, in one case the freshman captain very courteously postponing

game in order, to allow the school to By the way, the *Acta Columbiana*, Jan. is reports that game :—

v. 20. COLUMBIA vs. STEVENS; foot-core, 16 to 12, in our favor," (*verbatim*), thus declaring that it was a col-um that was so nearly defeated by the ;," and at the same time claiming the of having defeated the Institute. ever, the school is doing pretty well in s; its nine has not been defeated since laying a tie game (5-5) with the Insti-1884, and during the same time no eleven has defeated the High School HIGH SCHOOL.



cise in Mechanical Drawing—

: "How do you make a Maltese cross?"
ent : "Why, pinch his tail."

w equation to the arch, according to a is that in which the inordinates of the are referred to the arch—he! he!

knows the way to the Mathematical story? Has any one seen it yet? Do show to get to it; we are dying to know.

etime ago, "Preserve" was the man who st of the work in the mathematics room, appears to have been superseded by eady.

.L. treated '88 to a miniature Hades the lay. If the genuine article is propor-severe, '88 will be a model of good-reafter.

of our worthy professors calls "the third one-fourth really." Exercise n Lightning Calculation. Very severe l of approximation.

!! Don't speak it out loud. But the about the Institute make delightful ades, don't they? Ask some of the rs of the S. S. S. if they don't.

Soph." recently imparted the startling at the solubility of a certain gas was e same whether the water was "warm ." 'That's something like "up the hill n't it?

The hardest man in college to teach anything is a Sophomore, because he knows just enough to tickle his vanity without knowing sufficient to appreciate the brilliant reach of his stupidity.

It has been determined, after a careful investigation, that if a man monkeys with a twenty light-dynamo his funeral will cost just as much as though he monkeyed with a sixty light dynamo.

It appears that '88 has set up a free lunch counter in her class-room. "Strayed-off" has volunteered to act as bartender, and guarantees entire satisfaction as a mixer of American and Dutch drinks.

Prof. L. has allowed that there is one instance in which seats in the "bald headed row" are not as desirable as those further back. The instance referred to is the occasion of one of his "explosive" lectures.

The new name for Sal Ammoniac, according to one of the "Sophs." is Chili Saltpetre. Very elegant name, perhaps, but it was hardly appreciated by the Prof. and the occasion proved rather of a chilly one for the Soph.

A problem in engineering: When an engine is "loaded" is it necessarily drunk, and therefore incapable of working to the full extent of its efficiency? One brass button to the one who first sends us a correct solution of the problem.

The Seniors have finally completed their arrangements for commencement. Pach takes the photographs, and the class supper is to be furnished by the Brunswick. The honor men are C. Russell Collins, valedictorian, and Henry B. Everhart, salutatorian.

The study of Bacon, as pursued by '88, is indeed a most profitable one. The writings of that eminent philosopher are filled with the soundest doctrines, and are well calculated to be of the greatest benefit to the student who will carefully consider them.

A few days ago the storm door became disgusted with the lay of the landscape, and got up and walked down the steps, but, by the way O. W. J. looked at it, anyone might be led to believe that he really thought it had assistance in getting there.

These have been brought forth after several months of hard labor and thoughtfulness. There are seventeen more stanzas to each, which will be furnished on application. Please remit a niggardly nothing for the poet as he is a poor widower with four mothers and an aged child to support.

The man that recently put "Plainer Vise" on his drawing, probably meant that his drawing was much plainer than the drawings which had been previously made of the same thing. That is the natural inference. He may, however, have been too generous with his titles and put in an extra i.

No doubt the height of ecstatic pleasure is to sip the delicately flavored Hoboken ice cream from those high-priced and superior lead tablespoons used at the S. S. S. socials. Anyone that gnaws the spoons gets fined five cents, the price of two dozen. What an accumulation of spoons there will be at the end of the season.

It is very gratifying to see the interest being displayed in lacrosse. The fine days that we have had, have seen the Campus well filled with men hard at work with stick and ball to become proficient in the use of the same. The outlook for the coming season is intensely a bright one, and if the interest already displayed continues Stevens will be assured of success.

One of our learned professors recently took much time and pains in climbing up on a series of chairs to get at the top board of one of the sliding boards in the mathematics room. After risking his neck for some minutes tacking a paper thereon, he got down with an expression of satisfaction on his face like to that of a conqueror. What was the matter with pulling the board down?

The third German of the S. S. S. was held in the Institute, on the 23d of March. About twenty couples danced the German, which was led by Mr. Flack. The managers have every reason to congratulate themselves on its success. The only suggestion which could be offered is, that the halls in the upper part of the building be lighted, as some of the wandering ones might get lost.

"Die Umdrehungsgeschwindigkeit der Vergangenheit," is the title of the latest work from the gifted pen of the "Deacon." It is a description of an evening's enjoyment, as gazed upon in retrospect the next morning. "Deak" refers his head to tri-linear coördinates, and then gives the equations involved. He proves, conclusively, that the developed head is theoretically 2^3 times as large the next morning.

We notice that '89 is favored with a closet for T squares, but we have been unable to find, as yet, the location of a similar conven-

ience for the other classes. If any one would kindly show us the way to the same we would be greatly obliged. Just at present, '89 has the pleasure of keeping its own T squares locked up, and of fencing and spanking each other with those belonging to other classes. Quite a privilege but rather one-sided.

NEW STRINGS TO OLD HARPS.

TUNE—*Rig-a-Jig-Jig.*

As I was walking down the street,
W. O. J. I chanced to meet;
Said I to him, "what is your trade?"
"I'm a *sinusoid* maker, sir," he said.

TUNE—*In Heaven above.*

In heaven above where all is love,
We'll meet our Faculty there;
But down below where all is woe,
The "preps" will sure be there.

According to the principle of the conservation of energy, a large part of the energy expended as the clock runs down goes into heat which "warms up the house," physicists say, but any man that can invent a clock so arranged that it will warm up a man's breakfast at a certain time in the morning, will confer a great blessing on suffering humanity. Because, clocks, you know, are so much more regular than the average Hibernian fairy enthroned in the kitchen.

When the balmy summer time comes, the draughtsman is sorely vexed. The festive house fly lands on his drawing, when he is absent to dinner, and eats off the dimensions from his drawing. Then when the draughtsman returneth he sees it not, until he has forgotten what the dimension was. The nature of the subsequent remarks depends entirely upon the character of the draughtsman. Hence, to study human character, frequent draughting offices in the balmy summer time.

The Hoboken boarding house keepers remind one of the camel that put his head in the Arab's tent. They have monopolized the bulletin boards and all other bill posting places, and now they are instituting another monopoly by getting their respective boarders to sharpen table knives for them in the shop. Very soon, probably, places at the grindstone will be at a premium, and so when you look into the shop and see the whole class in single file with bowies and various other varieties of knives, you needn't think they are playing "Indian" or anything like that. They'll only be waiting for a chance at the grindstone.

Junior was describing to his girl a Turkath. He said, "The perspiration is so sive, that they have to put sticks of wood en the fingers so that the perspiration escape more readily." His mother retrated with him for drawing to such an t upon his imagination, but the girl in- pted: "Indeed, Mrs. Blank, it is all true, e a young lady friend who has been to and she told me all about it. Yes, and have to put pieces of wood between their oo."

om the appearance of the boards in the ematics room, it appears as though the rs spend the greater part of their time aying "Tit-tat-ter" and "Go-Bang" on oards. Yet is quite possible that this is stance in which appearances are some- deceitful. It is be hoped so at least. wise the course might degenerate. It l look rather funny, wouldn't it, to see stitute turning out men with the degree . T. T. T. (Master of Tit-tat-ter) or B. (Bachelor of Go-Bang)?

e Stevens Institute Glee Club was invited, ie Young Peoples' Association, of the yterian Church, corner of 6th and Hud- treets, Hoboken, to sing at an entertain- given by them on the 30th of March. rs. Cotiart and Campbell, after consider- ouble, got eleven of the members to- r. The singing of the Club was good, dering that it was the first time they had this year and the drilling they had red. Every one connected with it may roud of the success achieved.

friend of ours set out from a Hudson : town on a journey abroad. As the oboat sailed down the river our friend with the bluff old captain upon the hurri- deck and watched the friendly handker- : waving on the shore. The captain d and said: "Mr. H., you are going d; you will probably visit Athens and eil and gaze upon the remains of an civilization. I want you then to think ur old friend." "Yes, captain," replied 'I will think of you among the *other* nt ruins."

as been suggested that before the Seniors the Institute, perhaps it might be well to them a Household Tinkering course, so hen they get married, as they all will, no ere long, they can grapple successfully he kitchen stove, fix the pump or thaw

out the water pipe. It is also very valuable to know how to make picture cord out of scrap string and to carry a hod of coal up stairs without spoiling one's pants. Great stress should also be laid on the art of monkeying with carpets. Any man that can put down a carpet without strongly condemning things in general, at least six times, is one well up in the art.

It is very evident that '89, as a class, are not followers and believers in the Golden Rule. They make more trouble for the Sophs. than perhaps, they are aware of. Besides stealing thumb tacks regularly, they make it a point to have a good long game of Mumblety Peg or some other interesting knife game on top of the drawing tables. The result is that when a Soph. uncovers his drawing he finds it profusely decorated with knife holes, which of course add much to the general appearance of the drawing and he feels very much pleased with the effect, so much so, in fact, that he sometimes goes and gets a new sheet of paper so that it will be nicely decorated with ink, etc., the next time the Freshmen draw.

AN EDITORIAL GROAN.

I am tired of writing "chestnuts" on the little yaller dog,

I am tired of writing grinds on missing links,
And I am tired of reading letters from the man who writes "incog."

And I'm tired of setting up "the Board" to drinks.

I am weary of the "grinding" at the mathematics chair,

I am weary of the "laboratory bill,"
And I'm weary of iron castings which are always full of air,

And I'm weary of the literary mill.

I am sick of reeling pavements and the alcoholic jokes,
I am sick of hearing talk of colored chalk,
And I'm sick of writing "stuffings" at th' expense of other folks,

And I'm sick of hearing Mr. ——— talk.

The other day, Prof. L. said he was going to show the class some fine specimens of ruby and sapphire. The class thought that was pretty nice, so they all put on white ties and clean paper collars to celebrate the occasion, for they were all anxious to see how the real gem compared with the chewing gum prize jewels, with which they were so familiar. When the occasion arrived, however, and Prof. L. brought out about fifteen cents worth of old rock, the equilibrium of the class was nearly destroyed. He said that the specimen was a very fine one and was mined by a friend of his. But when some rash member of the

class followed that remark by saying that he "wouldn't *mind* it" a terrible panic ensued, and if it hadn't been for the fact that each man was fearful least his paper-collar should be damaged, great loss of life might have been the result. As it was, no one was injured, for which we are thankful.

The skeleton of the Freshman, who was foully dealt with last Christmas, has been sent to us. Our scientific editor, that is, one of the seven scientific editors, has partially classified the creature. We append the result of his labor.

"The skeleton in question is that of *Myctes Seniculus*, or howling monkey! It has two more dorsal vertebræ than man proper, and two less sacral vertebræ. There were nineteen coccygeal vertebræ, and it is assumed that there were originally between twenty-eight and thirty. The orbital ridges are more prominent than in man, but the head is narrower. The canine teeth are much more prominent. The teeth, instead of being set in a plane, are curved upward, giving to the head a peculiarly idiotic expression."

At this point in the analysis one editor borrowed the skull to frighten his landlady with. Another confiscated the two femurs and went down to turn out electric push-buttons on the lathe. Thus the poor Freshman's anatomy was raffled off before the classification had been completed. Hereafter, parties sending specimens for analysis, should inclose a five-dollar bill, as we cannot be expected to devote our valuable time to investigation, however scientific, without some remuneration.

ENGINEERING NOTES

A HIGH SPEED ENGINE.—During the last year or two, says an English paper, it has come to be generally understood that large machines, driven at a comparatively low speed, are the best for electric lighting purposes; but the lighting at the Lincoln's Inn Dining Hall and Library must be considered as an exception to this rule. The dynamo here is driven at no less than 12,000 revolutions a minute, by a Parsons high-speed engine, which justifies its title by running at the same rate. It requires some mental effort to take a statement of this kind seriously, yet there is no reason to regard the Parsons motor as a toy. It was shown in action at the Inventions Exhibition, running with unimpaired steadiness from the beginning to the close of the show. It is, in

reality, a combination of turbines driven by steam, and consists of two series of parallel flow turbines to the right and left of a central stream inlet, the steam exhausting directly from the first turbine into the second, from the second into the third, and so on through twenty turbines in each series. The steam parts with a portion of its energy in each turbine, and finally escapes at a pressure not much above that of the atmosphere. It is claimed that this is the first motor that has ever been made to work at the actual velocity of the steam as it escapes from the boiler.

A firm which makes a specialty of the erection of shafting states that its experience teaches that the loss of power due to improper conditions in the line of shafting amounts to fifty per cent. of the engine power employed, and that the defects most commonly found are as follows: Shafting too light for the duty, crooked shafting, hangers too far apart, hangers bearing too short, pulleys too heavy and not properly balanced, hangers which are not adjustable and not self-adjusting and sometimes filled with spurious babbitt metal, and improper proportion between two pulleys connected by the same belt.

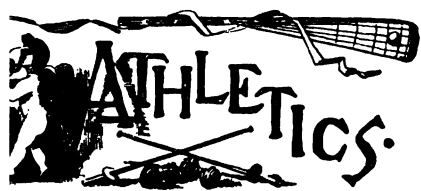
The great Northern Railway of Great Britain, has turned out a couple of new express engines with single drivers of rather tall dimensions: Cylinders, 18½ inches diameter by 26 inches stroke; diameter of driving wheels, 7 feet, 7½ inches; diameter of leading and trailing wheels, 4 feet, 1½ inches; distance from leading to driving wheel centres, 9 feet, 9 inches; distance from driving wheel centre to trailing wheel centre, 8 feet, 1 inch; total wheel base, 17 feet, 10 inches; framing, 1½ inch, steel; boiler of steel, working pressure, 150 pounds per square inch; total weight of engine loaded, 89,040 pounds; weight on driving axle, 38,080 pounds. Axle boxes to leading and trailing wheels are outside, while those of driving wheels are inside the wheels.

A new method for producing hydrogen gas—Superheated steam is passed through red-hot coke in a retort. The result is a mixture of hydrogen and carbonic oxide, or what is known as water gas. These gases are then passed on into a second retort, strongly heated in which a quantity of some refractory substance, such as fire-brick, is placed. At the same time jets of steam superheated to the point of dissociation are passed in the retort, the result being a mixture of carbon dioxide and a double amount of hydrogen. The

side can be absorbed by passing milk of lime, and thus pure hydrogen is obtained and collected in a gas-holder. The weight of coke is stated to correspond to 100 cubic metres of gas, and the cost is 0.015 francs per cubic metre.

Revue Industrielle gives the dates of introduction of railways in the following : England, September 27, 1825 ; September 20, 1828 ; France, October 1828 ; United States, December 28, 1829 ; May 5, 1835 ; Germany, December 1835 ; Cuba, 1837 ; Russia, April 4, 1838 ; September, 1839 ; Switzerland, July 15, 1840 ; Jamaica, November 21, 1845 ; Spain, 1848 ; Canada, May, 1850 ; 1850.

The tallest chimney in the world was finished in September, 1885, by the Mechernich Engineering Co. The leading dimensions are as follows : The foundation, in dressed masonry, is 36 feet square and 11.4 feet thick. The base is a cube of 32.8 feet, and the shaft is built of iron brick. The shaft of circular masonry bricks, is 397.2 feet high, 24.5 feet outside, and 11.5 feet inside diameter at the base, and 11.5 feet outside, and 9.8 feet inside at the top. The total height is 441.6



In the next number of the INDICATOR the season for outdoor sports will be opened, it therefore behooves us to make suggestions as seem necessary in the number in order that, should they meet with approval, they may be acted upon in time.

As lacrosse is concerned we have to offer, for the men likely to participate in the game seem all activity ; appearing on the field every day, delighting the eye of the spectator by the graceful sweeps of their bodies and their skilful passes and catches of the ball. Not so with base-ball, however ; with the exception of an occasional

catch between two or three of the students in one corner of the grounds, nothing at all is being done ; lacrosse, the new intruder, seems destined to supplant the famous old American game, which has heretofore played so important a part in college athletics, and unless something is done soon, will (at least at Stevens) entirely erase that game from our list of field sports. To allow this would indeed be a serious mistake, for whatever may be the beauties of lacrosse, it cannot equal base-ball as a scientific game, nor can it excite the interest or furnish so many examples of individual skill as the latter, when well played.

No other game has ever been able to draw the immense throngs that flock to see a match between two of our league clubs, showing the hold it has on the affections of the people. They watch the ball in its flight with a breathless interest, and the mighty cheer that fills the air when their favorite has scored a point indicates better than anything else the excitement as well as the popularity of the game. Why, then, should we allow it to decline ? The captain should pick out his men at once ; organize before the end of the term, and have every man on deck at the commencement of the next. The grounds by that time will be in good condition. Let a schedule of games be made out, beginning, not like heretofore, with the strongest clubs, but with our equals, and work up gradually, so that by the end of the season we may have some games worth looking at ; games that will stir up the dormant interest and once more put the sport at the head of the list, where it rightfully belongs.



The longest lacrosse throw on record is 397½ feet.

An exchange defines a "chestnut" as a man who has been in college longer than four years.

The students of Dartmouth, at a meeting held March 23d, raised \$1,500 for the support of a ball nine.

If you wish to see a delightful cartoon on one of our professors, just ask some Cornell friend to send you a copy of the paper containing it.

D. B. Chamberlain, of Harvard, beat the best intercollegiate record for putting the 16 pound shot, of 37 feet 10 inches, by putting it 38 feet 6½ inches.

The latest thing in the way of a burlesque on the Mikado was written and performed by the students of Vassar College. It is known as the Mathematikado.

At a private theatrical (between the acts).
Maid: "Coffee, sir?"

He (of the audience): "No, thank you; it might keep me awake next act."—*Ex.*

A great effort is being made at Yale to revive the interest in lacrosse. Prominent lacrosse authorities have expressed the opinion that Yale possesses the best raw material for a lacrosse team of any college in the country.

The *Northwestern* is following in the steps of some of the great New York dailies—that of publishing the favorable comments of its exchanges. Remember, esteemed contemporary, that "the weak, by concealing themselves strong, are thereby rendered inactive."

The base-ball season among the colleges was opened by Princeton and Yale on April 3d. The former playing the Quaker City team and defeating them by a score of 9 to 5, and the latter playing the Athletics of Philadelphia, which resulted in a victory for the Athletics by a score of 11 to 3.

The intercollegiate cup, emblematic of the amateur track championship of the American colleges, has been won six consecutive times by Harvard, by Columbia three times and by Princeton once. The cup is to be competed for fourteen times, and if Harvard succeeds in winning it once more during the next four years it becomes the property of the Harvard Athletic Association.

Probably the most exciting boat race ever rowed in England took place on the 3d of April. It was between the universities of Oxford and Cambridge. Cambridge won by half a length. The course was 4¼ miles, and

the time 22 min. 29½ sec., the longest time occupied since the contest of 1877. The average weight of the Oxford crew was 17 pounds, that of Cambridge 170½ pound. There have been 43 races, of which Oxford has won 23 and Cambridge 19, one resulting in a tie. The fastest time ever made over the present course was 19 min. 35 sec., by Cambridge, in 1873; Oxfords best was 20 min. sec., in 1869.

We beg to acknowledge the receipt of the following papers: The Delta Upsilon Quarterly, the University Herald, the Chronicle, the Electrician, the Concordiensis, the Targum, the Pleiad, the Tech, the W. T. L., the Sibyl, College Argus, the Chironian, the Tuftonian, the Northwestern, the De Pauw Monthly, the Williams Fortnight, the Haverfordian, the College Mercury, the Queen's College Journal, the Holcad Bowdoin Orient, the Vassar Miscellany, the Troy Polytechnic Rouge et Noir, the University Review, the Monochord, the Pennsylvanian, the '84, the Amherst Student, the Swathmore Phoenix, the Deacon, the Eclipse, the Willistonian, the Pithic, the Lafayette, the Cornell Review.



AVOIDING DANGER.

An old lady read a paragraph in one of the papers the other day, describing how a grindstone burst in a saw mill and killed four men. She happened to remember that there was a small grindstone down in her cellar, leaning against the wall; so she went out and got an accident insurance policy, and then, summoning her servant, and holding a pie-board in front of her face, so that if the thing exploded her face would not be injured, had the stone taken out into the road, where twenty-four pails of water were thrown over it, and a stick was stuck in the hole bearing a placard marked "Dangerous." She says it is a mercy the whole house was not blown to pieces by the thing before this.—*Wood and Iron.*

* the *

Stevens Indicator

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HOBOKEN, N. J.

* Stevens Institute of Technology. *

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THE ACADEMIC DEPARTMENT

— OF THE —

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No. 5.

THE ORIGIN OF THE ECHO.

Would you know whence is the echo,
Whence the weird and mocking echo,
Mocking, laughing at the red man?
'Tis the cry of horrid witches—
Witches domiciled in snake skins
With their homes among the mountains,
Whence they call to passers-by.
Iowi, the turtle dove,
Gathered seeds throughout the valley;
Through the valley calm and peaceful,
And her little baby slept.
Weary was she with her labor,
Labor tiresome and ne'er ending;
So she laid her sleeping burden
Under the Tihopi sage-bush
With his sister, fair Ohotcu,
With the summer—yellow bird,
Leaving both beneath the sage bush.
Wide she wandered in her searching,
Roved in search of seeds for eating.
Then appeared a fierce old woman,
Tsoavwits, the witch of red men,
Scowled upon the girl and asked her
Whether that was not her brother.
Then said fair Ohotcu, wise one—
She had heard that girls were nothing
In the estimate of witches—
"This is my own little sister."
Then the Tsoavwits was angry.
Angry with the girl and chid her,
Changed her own form into horror,
Scared the maid and stupefied her.
Then the witch took up the small boy,
Took him to a distant mountain
To her home in rocky places,
Down upon the ground she laid him,
Grasped him firmly by the right foot,
Stretched the baby's leg and strained it,
Till a man's leg was not longer
Next the left leg stretched she also,
And his right arm and his left arm,
And his body elongated.
He was now a man in stature
But a babe in thought and action;
Thus the witch obtained a husband—
Tsoavwits had long desired one,
But ere this had not succeeded.
To the sage bush, the Tihopi,
Glad returning to Ohotcu,
Iowi, the mother, sickened—
Sickened and turned pale with anguish,
When the lips of her fair daughter
Told her of what just had happened.
Punished she her daughter harshly;
Forth departed, crying, mourning,
Scorning all attempts to comfort

From her friends, her true avengers.
Chief among her friends her brother,
Kwina, eagle, the great traveler,
Journeyed over hill and plain,
Saw the Tsoavwits and Uja—
Uja, sage-cock, youthful husband—
To the Tsoavwits, the cruel one;
Yet he did not know the sage-cock,
For his nephew was a baby,
And the Uja was a chieftain.
Then said Iowi, the mother:
"If that is indeed my baby,
He will recognize my accents,
He will know his mother's voice."
So she went into the mountains,
Took her station in a cedar,
In a high and lofty cedar.
In a tree not very distant
Sat the eagle, Kwina, traveler,
Gazing at the boy-man, Uja.
Uja knew his mother calling,
Cried, "O, Squaw, I hear my mother."
But the witch laughed in derision;
Led him off to rest in quiet
In the caves within the mountains.
Uja had become a hunter;
In the art his wife had schooled him,
Schooled him well with bow and arrow.
So a mountain-sheep he slaughtered,
And his wife took out the entrails.
Then within the emptied stomach
Both took refuge, man and woman.
Tsoavwits could not imagine
Iowi, the saddened mother,
Looking in the empty stomach
Of a harmless mountain sheep.
Safe within this novel refuge,
Out of sight of all the searchers,
Puzzled by the disappearance,
Lay they many days, till hunger
Pressing sore, o'ercame their caution.
Kwina then, the mighty eagle,
Guessed their hunger, plotted 'gainst them;
Killed a rabbit, chose a pine tree.
Tall and lofty, stripped the bark off,
In the very topmost branches
Placed the rabbit, dressed and tempting.
Tsoavwits was very hungry
So she tried to climb the pine tree—
Fell back earthward hard and often;
Still she persevered undaunted.
From his hiding place the eagle
Swooped down on the baby husband,
Bore him back to the Tihopi,
Laid him gently 'neath the sage-bush,
And once more he was a baby.
Far up in the sky went Kwina,
And returning brought a tempest;
Brought a tempest in his anger;

Brought the fierce Kabibonokka.
 Then the flood came down in torrents,
 Torrents roaring in their anger,
 Covering up the eagle's footprints—
 Footprints Tsoavwits might follow.
 On the trail she found a feather,
 Found a feather coarse and grayish,
 That it lay there, Kwina knew not;
 That she found it, Kwina knew not.
 What cared he, the eagle, Kwina,
 That his deed had been discovered?
 Tsoavwits cried out in anger:
 "Well I knew the eagle, Kwina!
 Iowi calls him her brother,
 Kwina, warrior and chieftain!
 To the rattlesnake, Togoa,
 To the father of my mother,
 I will turn my vengeful footsteps.
 He will give to me protection,
 He will gratify my hatred."
 From his mid-day sleep Togoa,
 Roused by her approaching footsteps,
 Called to her, "You are not wanted!
 Turn away! You are not welcome!"
 Then she begged him for protection,
 For protection from the eagle.
 To their parleying came Kwina—
 Kwina still upon the war-path.
 Tsoavwits with fear and trembling
 Hunted for a place to hide her,
 Then in pity spake Togoa:
 "Crawl into my mouth and hide there.
 So the Kwina shall not see you."
 Opened wide his jaws asunder;
 And she crawled into his stomach.
 Retching seized upon Togoa
 Tsoavwits had hurt him sorely;
 She had caused him inward trouble.
 Thus he writhed, and squirmed, and struggled;
 Writhed, and squirmed, and struggled fiercely;
 Till at last his skin grew looser,
 And he crawled with ease from out it;
 Tsoavwits, his grandchild, leaving—
 Leaving in his empty snake-skin.
 Kwina, eagle, called her often,
 And she answered him with mocking,
 Gave him back his words in mocking,
 Till at last he ceased from calling.

* * * * *
 To this day in rocky regions,
 Hid in snake-skins live the witches,
 White men call these old hags "echoes."
 But the red man knows their voices;
 Hears the old hags when they call him,
 Call him loudly in derision.

CHIC.

THE NEW FERRY.

On Monday, May 3, the class of '86 began its last term at Stevens, and upon the same day another memorable event took place, *i. e.*, the opening of the new Fourteenth Street Ferry, which was expected to be in running order nearly a year ago. The Hoboken Land

and Improvement Co. celebrated the day by offering free travel to all patrons desiring to avail themselves of such an opportunity. So a few Stevens men, out for a daily constitutional, sally along towards the new ferry house to treat themselves to a free sail, to expand their cramped lungs, and to imbibe a little of the fresh breeze blowing over the Hudson from the north. Ever ready to criticize points of construction and taste, the various opinions from the gigantic intellects of these few students would doubtless be worthy of fullest note; but we can stop in this short description to give only a few of the principal criticisms.

Fourteenth Street is a wide, airy street, with but few buildings. It is newly paved with rectangular stone pavements. Leading to the ferry it runs for some distance upon a long pier which is solid earth-work, filled in between two wide walls of cross logs and stone. A walk for passenger use is at the left of the street as one approaches the ferry; it is supported upon piles at its outer edge, and by the solid pier at the inner edge; it is constructed of three-inch planks spiked to longitudinal timbers. At the outer edge of this walk comes the first object of our criticism, a six-foot board fence running the entire length of the pier and completely obscuring any view of the river, which, with its sails and steamers, always presents a varying and interesting scene. If it is absolutely necessary to have a solid board fence to keep the public from falling over into the Hudson, why couldn't it at least be a foot or two lower, so that one would not feel as if shut up in a box for several hundred feet before entering the ferry house? The ticket box for teams is at the left of the street instead of at the centre or at the right, but it is probable that New York teamsters are so accustomed to foreign ways in Hoboken that it will come quite natural to drive to the left instead of the right. The ferry house next demands our attention. It is large, of tasty design, and good proportion; it has two slips, and the general management and construction is similar to that at the Barclay and Christopher Streets ferries. Upon entering is found a large, airy waiting room, decorated uniquely and tastily. The designs above the windows and doors are especially worthy of note. But Stevens men always look high, and away up at the top of the building they spy something of interest to them in the shape of a long row of large transom windows hinged at the

top. Beneath these is a long horizontal rod carrying a crank for each window, to which it is connected by a connecting rod. At the end of the horizontal rod is a segment of a toothed wheel; in this works a worm which is attached to a vertical rod running to within easy reach from the floor. The end of this rod is squared to admit a small crank handle to be slipped over it; by means of a few turns of this crank the windows may easily be opened to any desired extent, giving good ventilation.

But a free ride even upon the old James Rumsey is not to be despised, so a mob of Hoboken children flock to entertain themselves therewith. In they pour through the gates, all sizes, shapes, conditions and nationalities; they run through the cabins in high glee, and mix indiscriminately with a crowd of urchins who came from New York on the last boat for a similar ride. They wait impatiently until the boat leaves the slip, then the breeze freshens, and off come all their hats to be held in their hands for safety. The uncombed hair of the little maidens streams wild in the wind, but more wildly shriek their little voices as they cheer every passing ferry boat with hats waving in the air, while one little urchin waves his own and one for his sister, who carries a little babe who is hardly old enough to leave its mother's arms. When the New York side is reached, the crowd rushes off, the young street Arabs giving characteristic yells as they arrive on their native soil. The ferry house at the New York terminus is situated at the foot of Fourteenth Street; it is small, having but one slip, and cannot compare with the Hoboken buildings. As we approach Hoboken on the return trip, the current runs swiftly by the ends of the Hoboken slips, and it is no wonder that they were once washed away during the process of construction. The pilot brings the boat successfully in, although it bumps roughly against the side of the slip. These slips seem to be particularly well made, the upright planks being set off a considerable distance at their upper and lower ends from the piles to which they are attached, allowing them a remarkably good spring at the centre. The lower ends of these planks rest upon the edge of horizontal planks which prevent them from sliding downward.

So ends the free ride, and the students who live in the upper part of the town calculate the time possibly to be saved by patronizing the new ferry. Everybody leaves the boat

with a feeling of no little satisfaction for having had at least one ride at the expense of the Hoboken Land & Improvement Co. The flock of children have lost most of their excitement, and run more quietly from the ferry-house; while the students, with somewhat refreshed bodies, wend their way toward the weary boarding houses, to partake of the elegant hash and rice pudding dessert; there to cram their brains with calculus which doesn't seem to have the least connection with ferries, but which, in fact, may possibly some day be of valuable assistance to them in just such kind of work.

THE FIRST THERMOMETER.

For a long time philosophers have been in doubt as to who was the real inventor of the thermometer. The history of this simple instrument is useful as well as interesting, because it aids us in tracing the histories of various other instruments with more certainty. Some industrious physicists (Wohlwill, Gerland, etc.) have been making use of the earliest records, and have at last got the history of the thermometer very nearly complete. Very nearly, because there still always remain some points which cannot be proven but are highly probable.

Galileo Galilei is now thought to have been the man who made and used the first thermometer (1593), and this on account: firstly, of statements made in letters written to him by his fellow countryman, Sagredo; secondly, of those published in a biography composed by one of Galileo's pupils; last, not least, Castelli's description of the instrument used by Galileo agrees exactly with the thermometer kept in a Florence museum and said to be the original one. This instrument is an air-thermometer, consisting of a hollow glass sphere, about two inches in diameter, blown at the top of a rather thin tube.

The other end of this tube is immersed in water, while we heat the inclosed air by holding our hands around the globe. Consequently, on cooling, the air contracts and the water rises into the tube; the fall or rise of the water thus indicates that the air has become heated or cooled.

In the 17th century several other physicists were spoken of as the inventors of the thermometer, amongst others Otto von Guericke.

The first improvement on Galileo's apparatus was that instead of using a straight tube, the

tube was bent into a U-shape and the open end widened to a small globe to receive the water. The whole was fixed to a small board, with a scale to read the position of the water. Very soon, however, experimenters found out that both kinds of thermometers were very poor instruments to measure heat with, because the expansion or contraction of the air inside of the globe depends not only upon the temperature of the air, but also upon the atmospheric pressure. This objection was overcome by Jean Rey, who reversed the apparatus of Galileo, filled the globe and part of the tube with water, and thus changed it from an air thermometer into a water thermometer. This form of apparatus (afterwards called the Florentine thermometer) also remained very defective on account of the quick evaporation of the water, until Ferdinand got the apparently simple idea of closing the top of the tube. He boiled the water until all air was driven out and then sealed the tube by means of a blow-pipe.

It is not known who first substituted colored alcohol for water, thus enabling experimenters to measure temperatures below the freezing point of water. Reaumur mixed the alcohol with one-fifth volume of water so as to be able to measure all temperatures between the freezing and boiling points of water. It is known, however, that Fahrenheit was the one who made the best mercury thermometers, pure mercury having the advantageous properties of freezing at a temperature far below the freezing point of water and of boiling at a temperature much higher than either water or alcohol. Reaumur objected to using mercury because its co-efficient of expansion is smaller than that of alcohol; but the subsequent forms given to the apparatus also overcame this difficulty.

THE SCHOOL OF TECHNOLOGY AT BERLIN.

The following description of an institution that promises to become the best of its kind in the world will undoubtedly prove of interest to some of the readers of this paper:

There are, in all, five courses pursued—1. Architecture; 2. Civil Engineering; 3. Mechanical Engineering and Ship-building; 4. Chemistry and Metallurgy; 5. General Sciences. The complete course, in any one of the departments, embraces eight "semesters" (half years). The annual register contains thorough plans of all the studies for the whole course "in order to give a list of all the lectures in

such a way that every lecture is introduced into that semester in which it will be heard with most success." This enables the students to pick out their studies themselves. The fifth department, "General Sciences," embraces lectures on collateral subjects, as mathematics and higher analysis, theory of projections and descriptive geometry, experimental and analytical physics, drawing and modeling, and the modern languages—French, English, and Italian. It is, in reality, only a branch of the other courses wherein the men are fitted for the various "technical professions." Besides this, all the students are entitled to hear lectures on other sciences, as philosophy, history, literature, political economy, etc., which are delivered at the Berlin University itself.

There are at present ninety-six instructors—fifty-five "ordinary and extraordinary professors" and forty-one private tutors and assistants—at the technical school alone, besides eighty-six "controlling officers." Among the professors there are many names of world-wide reputation, as Du Bois-Raymond, Weingarten, Reuleaux, Vogel, Dobbert, Hauck, Ende, Rietschel, and others.

In the summer term of 1885 there were, altogether, 588 matriculate students, of which eighty-one were foreigners (nine from the United States); nearly one-half of them belonged to the third department—Mechanical Engineering and Ship-building. Besides these there were 295 special students, so-called "hospitalants," sixty-two of whom were University men.

Although this attendance appears rather small when compared with that of the University, still there is not the slightest doubt as to the increase of the number of students within the shortest time. A great deal is done to enable students without means to attend the school. About forty men received scholarships, seventy-two obtained yearly stipends of 600 marks from public or private funds, and forty were occasionally assisted with from 150 to 300 marks. The expenses of all *inspection tours*, some of which last for weeks at a time, are paid for by the *government*.

The choice of lectures being entirely left to the student, not the least importance is laid to his attendance or non-attendance at the school. All the stress is laid on the examinations, which, of course, must be very thorough. The oral examinations are reported as special "terrors." But, still, a redeeming feature is that the student may apply for any examination as soon as he is ready to take it. He may try until he succeeds.

MODERN AMERICAN PASSENGER LOCOMOTIVES.

In the past few years there has been rapid progress and improvement in many ways in America. Some have attributed much of this to the International Exhibition of 1880, in which American manufacture received much credit, and which in a few years began to make its influence evident. However this may be, it is a fact that since the year 1880, American locomotives have been so improved that we might call that year a renaissance in locomotive construction. It will be of interest to consider, in a general way, the principal types of locomotives that have been built since that time.

The type of locomotive in America in general for passenger traffic, has been the "Standard" locomotive, having a leading wheel truck, two pairs of driving wheels, the first pair being the main drivers. Changes in the accepted design at first made their appearance, claiming questionable advantages over the ordinary type. The first innovation was a locomotive built for the Bound Brook and New York Railroad in March, 1880, by the Baldwin Locomotive Works. It was designed for fast passenger traffic, and had but one pair of driving wheels; the weight of the fire-box being carried on a two-wheel truck. Part of this weight, however, could, when necessary, be transferred upon the drivers by means of a steam cylinder.

This locomotive made some fast time on a short, empty train, but it was never regarded as a success, and was finally sent to the shops, where certain experiments were made with it. No more engines of that type have since been built. The next experiment was that of the "Shaw" four-cylinder locomotive, which was a "Standard," with two cylinders acting upon each main driver. It was made with the hope of overcoming the limitations of the engine at high speed. This was built at the Hinkley Locomotive Works, and was given a fair trial, but it never demonstrated its superiority and was finally consid-

ered a failure, as in the attempt to overcome one trouble, many more had been introduced. The two "Fontaine" locomotives were also brought out in 1880, and created considerable curiosity and some excitement. Much discussion was carried on in regard to the merits of their construction. The main driving wheels were elevated, and rested upon the regular driving wheels, causing them to turn by frictional contact. Trials were made with these on several lines, but nothing seems to have been gained by this system of gearing that could not have been attained by using ordinary driving wheels of a larger size. The two were finally rebuilt and changed to the "Standard" pattern.

These, however, were the theories of "practical" men. Meanwhile, men of true theoretical education had come to the conclusion that the "Standard" was the most efficient type of locomotive for passenger service in this country. The only problem was to increase the steaming capacity of the engines, by enlarging the boilers and fireboxes, to increase the size of cylinders and wheels as far as practicable, and to perfect the reciprocating parts and wearing surfaces. In 1881 the Baldwin Locomotive Works turned out a set of ten locomotives of "Standard" type, designed by Mr. Woodcock, of the Central Railroad of New Jersey, to run the fast passenger trains on the Bound Brook Line. Notably among these is No. 169, which has proved to be one of the swiftest locomotives in the world. This has 18 in. by 24 in. cylinders, with 68 in. driving wheels, and weighs 45½ tons. After five years of hard and regular service, it is now to go into the shop for general repairs, confirming the truth that a machine built on true scientific principles will work longer, as well as faster, than those of ordinary construction.

The Pennsylvania Railroad, in June, 1881, built the first locomotive of "Class K," having 18 in. by 24 in. cylinders, 78 in. wheels, and weighing 46½ tons. These, at first, attracted a good deal of attention owing to the large size of their wheels. There are now eighteen

of these doing good service on the Philadelphia express trains on that road. Three years afterward the "Class P" were built, having 18½ in. by 24 in. cylinders, 68 in. wheels, and weighing 50 tons. There are now twenty-two of these running and they show themselves capable of hauling fast trains of from ten to twelve cars. The West Shore Railroad has 100 "Standard" locomotives, with 18 in. by 24 in. cylinders and 68 in. wheels, designed by Mr. Howard Fry and built at the Rogers Locomotive Works. There are two classes, hard and soft coal burning, there being forty of the first class, weighing 48 tons, and sixty of the second, weighing 47½ tons. As in the Pennsylvania locomotives a number of English features have been introduced, making them somewhat of a departure from the accepted American model of outline. Being admirably constructed, these West Shore locomotives have operated with entire satisfaction fast trains of five or six cars and heavy trains of twelve passenger cars. The Philadelphia and Reading Railroad, to operate their section of the Bound Brook line, built some locomotives, "Class D 33," with the Wooten fire-box, which rests on top of the frames over the driving-wheels, and is very wide, having an area of 76 sq. ft. These locomotives have 21 in. by 22 in. cylinders, 68 in. driving-wheels, and weigh 48 tons. The cab is placed forward, over the main driving-wheels; the main principles of the "Standard" type are retained, however. They have been run at very high speeds with trains of six cars. Last year, 1885, the four heaviest passenger locomotives in the world, "Class D 44," were constructed by this road. These were built with the Wooten fire-box, and have 21 in. by 22 in. cylinders and 68 in. wheels. They weigh 54 tons. No definite results have yet been obtained from these immense locomotives, but heavy passenger trains of fourteen cars have been hauled with ease at considerable speed.

In noting, therefore, the improvements in modern locomotive construction, we find that the average "Standard" passenger locomotive of ten years ago, which had 17 in. by 22 in. cylinders, 60 in. wheels, with 130 lbs. boiler pressure and weighing 35 tons, has changed now to one having 18 in. by 24 in. cylinders, 68 in. wheels, with 140 lbs. boiler pressure, and

weighing 45 tons. Injectors for feeding the boilers have taken the place of the pumps. Steam reversing levers have found some favor, and the Westinghouse air-brakes have found universal adoption. The Richardson-Allen balanced slide-valve is coming more and more into general use. The huge "diamond" smoke-stack has been done away with, and the straight stack has taken its place, while the use of the extended smoke box is becoming general as the best spark arrester. But not only have we improved in the efficiency of our locomotives, but their appearance has greatly changed for the better. The old-fashioned brass trimmings, fancy brackets disposed in various places, the gaudy paint, have all disappeared. A simplicity and uniformity of design is shown, and the main beauty of the locomotive is found in the shape of the machine itself.

ALBITAN.

ELEMENTARY BLOW-PIPE ANALYSIS.

VII.

The synopsis contained in this article, the last one of the series, has been prepared to present a general view of the subject in a condensed form; it is also intended to give a convenient working table for laboratory use; and to facilitate the latter, the order of the elements as given in the first vertical column has been made to coincide with the order as generally given in books on wet analysis, some rarer elements and a few reactions for acids having been added.

At the top of the remaining vertical columns the numbers of the groups and the principal apparatus or reactions are given, so that any reaction in any vertical column can readily be found, explained more definitely by referring to the corresponding article or group.

By comparison it will be found that for each element there is some test in the dry way by means of which it can be detected. Of course it must not be expected that an unknown element can always be unmistakably determined by a beginner, simply by comparing the observed reaction with the results given in the table; but some patience and practice will be necessary to master the subject. If there should be any doubt about a certain reaction, repeat it, or make a wet test, or, best and quickest of all, take the supposed element, make a dry test and observe whether the same reaction occurs.

it will be understood that blow-pipe analysis never take the place of wet analysis, always will be a very valuable help to the latter, as it can readily determine the contents of a test substance. If the sample should contain more than four or five elements, or only minute traces of some of them, a complete examination can then be made in the wet way. Nevertheless, time will still be saved, as all the elements which have been determined in the dry way need not be considered when the wet analysis is made. The best practical application of blow-pipe analysis is made by the mineralogist and assayer in the preliminary

examination of ores and minerals in which but one or two useful minerals are sought. It is also indispensable to the successful mineralogist.

The literature on the subject is quite extensive, a number of separate volumes having been published, and almost every work on mineralogy contains a chapter on blow-pipe analysis, with special reference to minerals.

If these small efforts have created an interest in any of my readers for this beautiful and neat method of analysis, or if they have been of any assistance in the chemical course at the INSTITUTE, my time on them has been well spent.

O. PF.

[illegible]

A new element has been discovered by Prof. Winkler at Freiberg, Saxony, in a new mineral, argyrodite, recently found in the Salsfuerst mine at Freiberg. The mineral contains 73.75 per cent. of silver, 17.18 per cent. of sulphur, 21 per cent. of mercury and 6.7 per cent. of the new element,

called GERMANIUM by its discoverer. The physical properties of the new element consist in a gray color similar to that of arsenic. It has a medium lustre, volatilizes at a cherry red and is heavier than antimony. Its atomic weight is supposed to be between those of antimony and bismuth. — *Extract from Dresdner Anzeiger, Feb. 28, 1886.*

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IN our last issue appeared a communication, signed "High School," which received our careful attention. We feel compelled to say that the writer treated the subject from an impartial standpoint, and, recognizing this, we admit that many slurs at the "Preps." have crept into our columns. While it is readily admitted on all sides that they are at times a nuisance, the many good deeds they have done on behalf of the college, as narrated by their champion, deserve recognition.

IN a recent issue of the *Scientific American Supplement* appeared our article on "The Youth of Isaac Newton." In a still more recent issue of the *Scientific American* we found two smaller articles taken from our April number, but placed in reverse order. We take no exception to the latter paper, because it is customary to copy short "notes" without crediting the papers in which they originally appeared. We do, however, consider the insertion

of our article on Isaac Newton nothing less than plagiarism. To be sure the *Supplement* lays some sort of claim to being an eclectic periodical. This, however, does not relieve it of the obligation, imposed by even the scantiest courtesy, to credit the paper from which their articles are clipped. We would be ready to acknowledge the honor shown us by our esteemed contemporary in thus clipping from our obscure sheet, were we not painfully impelled to believe that it was purely in an endeavor to "fill up" that "The Youth of Isaac Newton" appeared in another sheet as "Isaac Newton." At the moment of going to press we notice that the *Supplement* has again drawn upon our columns; this time giving us credit. There being no time to change the above editorial, we will let it stand as a protest against past actions. We are now fully convinced that the *Supplement* intends to honor us, not to steal from us.

THE action taken by a certain instructor in the last examination is either very just, or very uncomplimentary to the Sophomore class, according to the standpoint from which we consider it. If the gentleman in question was prompted by a sense of justice in taking a seat in the rear of the room, so that those whose names had not fallen in pleasant places in the alphabetical list might have the same advantages for cribbing that those in the rear had when the desk was occupied, we give him credit for an amount of fairness rarely equaled in our American colleges. If, on the other hand, he considered a rear seat the most advantageous one for the purpose of spying out the dishonest students, he casts a slur upon the reputation, not only of the class, but of the college. For, the natural inference is that he, being a graduate of the college, has seen during his four years' course numerous acts of dishonesty among his associates. This poor estimate of the character of the class of '84 we instantly repudiate. There is only one inference left.

partment of mathematics has become the originality displayed in its conducting the present collegiate year. Perhaps, even probably, this departure from the accustomed order of things may be expected as follows: Our professors, as a rule, are not a man a gentleman until he proves a knave. The originality of which we are talking consists in considering a man a gentleman until he has given *repeated* evidence of a gentleman.

INDICATOR GARDS.

Seasons have come and gone, and the conditioned student has rested his head and given himself over to the material of life. And even now he returns to college with a happy countenance, for his purse and sheer loafing is uncongenial to the many promises made to him in his head, he is bracing up for four more weeks of study. Remember, only four weeks! Work harder than ever!

The advent of the "cherub" has dispelled the hanging over the classic features of J. The "cherub" may require description. He is of medium height, wavy axon curls form a fitting frame for his face. His pale blue eyes turn languid on you when you address him, but sometimes he is gazing off into the misty unknown. It would be almost impossible to say that it (the cherub) is able; his actions make that apparent. I append one example:

When, since it became necessary in the face of human events to refill the water-cooler, O. W. J. called together his staff and discussed the matter. It resulted in the "cherub" being detailed for the work. This was under the most approved economic system. The bucket standing beneath the cooler was emptied into the cooler (!). Then the "cherub" bucket was employed to carry water from the hydrant to the required spot. We then proceeded to sample the contents of the cooler, which the other fellow did. Poor little "cherub," how we pity him when the other fellows do him!

COMMUNICATIONS.

To the Editors of the Indicator:

Understanding that up to the present time your appeal to the Alumni for support has received no answer, and since it seems that they have no suggestions to offer, allow me, as a student and member of the I. P. Co., to offer this suggestion:

Let a committee be appointed by the company to meet the Executive Committee of the Alumni. Give this committee full power to act. In this way, perhaps, the Alumni may be roused from their indifference and urged into some sort of action.

A PROSPECTIVE ALUMNUS.

To the Editors of the Indicator:

It seems to me that arbitration between the college and the Alumni will not work. If the publishers of the INDICATOR wish us to support them they must abandon the stock company scheme and go back to the old method of electing editors. I, for one, do not consider the INDICATOR a paper representing the college. If the classes are allowed to do the electing they will then be represented, and the paper will receive both financial and literary support from the Alumni.

JUSTICE.

To the Editors of the Indicator:

I like your plan of arbitration as suggested in the INDICATOR for April. It is a pity that the Alumni do not support such a worthy college enterprise as the INDICATOR, and yet there is cause for the present difference of opinion. The stockholders in the first instance were elected by the college—or, rather, appointed by the chairman of the college meeting. At the present time who elects new stockholders? The company. In other words, the men in the company have the right, if they so choose to exercise it, to elect *all* the members from one or perhaps two classes, leaving the others in the cold. Is this right?

In justice to the company I admit that the stock company plan may have, at the time, saved the paper from ruin; yet, now that the financial condition of the INDICATOR is sound, it might, perhaps, be well so to modify the Constitution of the company as to satisfy the views of the Executive Committee of the Alumni, without in any way hindering the literary advancement of the paper.

CONSERVATIVE.



Good-bye George—Ta ta !

Glad to see you sober enough to be around so soon after vacation.

"The Spring has come, the flowers are here. "Whoa, Emma!"

Matthew supports a new stiff hat. O. W. J. will be parading around in a dress suit next.

The grand systematic bounce from Math. has begun again. Whatchergivenus. B. waxeth bold.

"Who struck Billy Patterson?" The "yaller dog" I guess. Billy probably struck him back.

Lacrosse is booming, but the season isn't fully opened yet. No one has had his nose broken.

Owing to the illness of Mrs. Lewis, Dr. and Mrs. Leeds' reception to the senior class was postponed indefinitely.

Mike, the coal man, won't come around the Institute any more because he's afraid some one will take him for a Freshman.

Come one, come all
Both great and small
To Kegelbehn's and take a "ball."

Not at our expense, though. Dutch.

The man who stole that three hundred dollar zinc watch from Christian had better give it up. Christian has the "pug hound" on his track.

Isn't it too bad to see that reckless, naughty, look beginning to steal over the faces of the innocent little Freshmen? "'Tis true, 'tis pity, and pity 'tis 'tis true."

An entrance requirement should be a thesis. To be compelled to compile, originate, buy or purloin a thesis third term, senior year, is the hardest tug of the whole course.

The present term is a short one and the chances are that the general tendency will be to let things slide. But don't do it, boys, don't do it. "A miss is as good as a mile."

Where, oh where, is the Stevens Rowing Club? Challenges are arriving and lying around loose, but they fail to find a claimant. Get out the shad boats, boys, and turn inside out for a change.

History tells us that Shakespeare's father was an alderman, but we think that there is some mistake somewhere, because history also tells us that he was very respectable, and the two statements don't agree at all.

The industrial exhibition held at the institute proved to be a very interesting one. Some of the work on exhibition displayed a skill equal to that of a first-class workman, and fine productions were to be seen in every branch.

Nowadays, the average man about the college don't think he is performing his whole duty unless he pulls the new fire hose off the wall and fills it up with water. O. W. J. has got a great, big cast-iron ax that he is sharpening up for those men.

For "private tips" on the labor question, the distinctions between the terms "tie up," "lock out," "boycott" and the influence of two-ply trousers on the eight-hour system, you may rely on the senator from Washington as being way up beyond his years on those topics.

Isn't it delightful to look upon the campus and watch the infantile "Prep." turn a hand-spring and break his rope suspenders? If the "Prep." was less innocent he might paint the atmosphere red, but he don't know the wicked ways of the world yet. Wait until he gets to be a Freshman.

We did not know that we had a member of the pugilistic fraternity among us, but it seems that one of our worthy professors knocked the magnetism out of a bar of iron in three rounds, quite recently. We saw him do it, or else we wouldn't have believed it at all. Strange how things will happen, isn't it?

An incident which strengthens the theory of the weakness of human nature transpired *less than a year ago*, right here among us.

Prof. to class: "In closing, I would suggest greater care in writing. I find a great many *grammatical* errors in your papers. That will do. Take the *three first* chapters for to-morrow.

Burdette has concluded that "The eminent scientist who discovered that heat is only a form of motion, did it by sitting on a hot stove in the dark. The motion he discovered was the motion to adjourn, carried by a rising sun."

It would be well for the Seniors to reflect on this fact in theses which touch upon the subject.

Scene in Freshman class. Roll call :

Prof. : A-mo-r! (little pause) Beers! Mr. Beers wakes up and answers to his name. Mr. B. answers also. Prof. calls Beers.

Mr. B. answers again. Some one whispers audibly in the back of the room : "That's two beers for him. Keep it up and don't have a recitation."

H. B.'s watch believes in giving plenty of time for examinations, if he don't. When the last Calculus examination was held, the professor very kindly stopped about half-past eight and gave the students about an hour and half more than they were intended to have, but not a bit more than they ought to have had. Hurray for the watch!

George Boo Booh, the Burmese missionary spoken of, has given up the field and opened an office on Hudson Street. Three Chinamen took down the tin sign last week and got it up on the spot, but when a Dutch under-kicked Yuggie Boo, as missionary, all the Elysian Fields in hopes of getting a new "cops" had not a word to say. The teacher loife, they hadn't.

Scene : Stevens High School.

About thirty Preps. standing together. One holds an apple. Cuts the apple up into parts and distributes them.)

Prof. : "Why is this apple like the flowers in the garden?"

Student : "Intellectual 'sneak' by the crowd of results."

Prof. : Well, because its very finely divided. A terrible panic and great loss of life. Prep. class volatilized gore. Red music and red.)

PEACHBLOW!

Anger when thy friend spins thee a yarn,
Lest from the dust heaps of the Long Ago,
Lashed though it be with wrinkled jokes
First saw light what time the ancient sage
Iselah spun tops and played at "mibs,"
Heit told thee for original,
Gotten off with all the conscious pride
Of thorship—no longer, I repeat,
Thou shout "Chestnuts!" at the guilty wretch,

Nor murmur "Swipes!" in his enchanted ear,
Lest he should chide thee for the use of these
Which indicate antiquity themselves,
In their own toothless second childishness,
But with a calm and quiet dignity,
Thou shalt say "Peachblow!!!" and the offending
one

Will seek out for himself some little hole,
Crawl in, and there expire, and be no more!

It is rumored that the fashionable plaid paper seen and used so much around the Institute lately is going to undergo a change in price, so as to come within the reach of the poorer classes. When the spondulix received approximates to the amount that was paid for the plates, then the microscopic checker boards will be sold by single sheets, if desired, and probably at a low price. Nothing like getting both feet planted, is there? The above is on good authority. Three hens, a sparrow, and the south wind told us about it.

Some of the Sophs' examination papers in "descriptive" are profusely decorated with various witty paragraphs from the pen of the professor who corrected them. Below is a specimen :

"The line through the vertex of a cone can be called tangent to the cone *only by special act of Congress*, and it satisfies equally well the condition of the line piercing the cone." And as another example : "This is a very curious expression and its *intention obscure*." The student tried to supply his want of knowledge by what is commonly known as "gas;" but the scheme failed to work in this case. These are but two cases. There are myriads more, and all equally pithy. We refer you to the Sophs. for an investigation of the same.

This is the time when the lazy Freshman taketh to himself great vileness and bethinketh himself how he shall bulldoze the elder. So he goeth straightway to the elder and saith with face like unto brass : "Behold, I have taken much marks to myself, but so likewise hath another. We are a tie for first place in the class. So then must I go to another examination to burst asunder the tie. Now, seest thou the reason why I will take to myself a private tutor?" Then the elder smiles a Jumbo smile and grateth his ears together at the back of his head, and kicketh his tremendous feet high in the air. "Go then, my son," he saith, "and take to thyself a private tutor." And the son goeth forth and just manageth to pass off his "*conditions*" and no more. (Look in the June number for the rest.)

OUR SORROW.

What makes our halls so lonely?
 What makes us breathe a sigh?
 'Tis not because we've only
 One more exam. to try.

'Tis not because we flunked last term,
 Nor will we flunk the next;
 'Tis not because discontent's germ
 Has all our bosoms vexed.

Our Profs. are all we could expect,
 Our tasks are not too hard;
 To our boarding house we can't object
 Because the butter's lard.

Whence then this awful sorrow?
 Whence this aching pain?
 It may leave us on the morrow,
 But 'twill return again.

How can we fix our mouths to tell,
 Or half our pain disgorge,
 Oh! how our hearts with anguish swell,
 When we ask you,—*Where is*——?

The "Preps." are getting up a play. The show cards are out. Home made. Look at this:

KUMM TO CE US

IN THE GRAIT PLAY, BY JAY GOULD, KALLED

ME AIRGAGWOGGEN,

THE EARTH OR WATT DU YER WARNT.

Tickuts Wun Doller.

Dorgs And Menn Withoute Kollers Not
 Erloud.

KUMM TO CE US.

Those "Preps." ought to be looked after. The death rate in Hoboken is already large enough without running it up in that way. Mayor Timken ought to come up and step on a couple of hundred "Preps." and chaw things up a little.

Hurray for '88! The bar still flourishes, and the class are contemplating the building of a gutter and the erection of a lamp-post. The gutter is for the convenience of "dead drunks" and the post is for the accommodation of "lamp-post drunks." The warm weather will probably necessitate the election of another bar-tender. The deacon is suggested, as he has the reputation of being able to mix all those kinds of "medicines" that deacons take in the drug store, which are much relished by many young men outside of the brotherhood. The gutter and lamp-post idea is a very good one, as it obviates the necessity of

going into the street for those indispensable factors of a good old-fashioned drunk and does away with the danger of arrest. The only thing that stands in the way of its complete success is the fear that the gutter can not be made large enough to accommodate every one who wishes to occupy it.

THE "BOLT."

The *Bolt* for 1886 is certainly a most creditable production. Feeling dissatisfied with the showing made last year the new Board, with doubled numbers, set to work on the forgings for the present issue. The wisdom of having eight editors instead of four is apparent upon every page. However, we leave the book to win its own way into the hearts of our friends.

There are several special features, however, worthy of our criticism, which shall be in a marked degree favorable. The indo-print of the Class of '86 is an improvement on the original photograph, the light on the faces being more in contrast with the background. The editorial is remarkably well written, and carefully presents the ideas and aims of the Board. "Ye Loved Ones" strikes the right chord in the heart of every student, while the "Glee Club" brings up associations which reconcile us to the life of study which we have undertaken. The dedication "To '86, '87, '88, '89" is very neat, and will probably please all save '89. We are disappointed in the picture of the foot-ball team. It had much better have been left out entirely.

But the most interesting feature is the instantaneous photograph of the Class Day exercises at Castle Point in June, 1885. While Mr. Williams was delivering the opening address a photographer, stationed on the gallery of the Stevens mansion, obtained the view which has been worked up into an indo-print. Although the view is rather small, certain well known individuals are easily recognizable, and we feel assured that a careful use of the magnifying glass would result in the identification of almost all the college men who honored the occasion with their presence.

ENGINEERING NOTES

represent the deepest well in the world is Newwood, Pa., owned by Mr. Geo. West-se, Jr. In this well everything found of nature of gas or water at a depth of feet was cased off as unimportant, and present depth is 6,000 feet below the surface which makes this the deepest well in the world.

Since it would necessarily have to be a prolific gas vein to justify such extending, it is a difficult matter to conjecture the object that prompted such a work, unless purely to satisfy curiosity.

There is in Washington Co., Pa., a well to a depth of 4,000 feet, and the only one so far as known, which approaches the depth reached by Mr. Westinghouse, are an iron well in France, in which a depth of 5,000 feet was reached, and the well now being sunk at Schladebach by the German Government which at the last accounts had reached a depth of 4,565 feet.

The durability of steel rails is discussed by Mr. E. B. Webb, of the London and Northwestern Railway, who states that, according to his calculations, 1,400 pounds of steel disappear every four miles from the track of that company's line, 1,780 miles in length. At first glance this seems a surprising statement, but it is equivalent to 16 tons each hour, or 16.8 tons a day, or 168 tons each year, for a line of 1,780 miles, having an exceptionally heavy traffic. The length of the railways of this country are 71.3 per cent of the London and Northwestern, the same rate of destruction by wear, the quantity of steel rails required for replacement on all the roads of this country would be about 438,000 net tons. The consumption of rails in 1883 in this country was 1,400,000 tons, of which 6,500 miles of road required perhaps 650,000 tons, leaving 750,000 tons for replacements both of iron and steel. It may be inferred that the destruction of rails by wear on the London and Northwestern is not relatively so great as it is on many roads in this country.—*Iron*

Manufacturers' Gazette says: "Wires are now produced direct from fluid by pressing it out through dies in a manner similar to the production of lead pipes and rods. An iron vessel, lined with refractory material, is provided with a man-hole and

a cover at the top, and securely closed. At the bottom, opposite the man-hole, there is a cast iron outlet pipe, through which passes a steel tube with water circulating round it exactly like a 'tuyere,' by which the steel pipe or die can be cooled. The inner end of the steel tube is lined with fire-clay, where the very hot fluid steel meets it. The tube is plugged up by a steel stopper, and the liquid steel is filled into the vessel with liquid carbon dioxide above it. The stopper being withdrawn, the liquid steel is forced out by pressure of the carbon dioxide in a red-hot rod or wire, which goes from the vessel into the rolling mill while still hot, and is there finished off. We may also add that steel is now produced direct from the ore by a new process of a French engineer. The ore in a powdered condition is submitted to the action of carbonic oxide gas at a high temperature in a cupola or blast furnace, where it is reduced by the incandescent gas to pure iron or steel."

The apparatus for registering the speed of trains, in use on the German railroads, has been improved by the famous firm of Siemens & Halske. The position of the train at any point on the track is registered by means of an apparatus consisting of two upright vessels containing quicksilver and communicating with each other, one of which is exposed to pressure on the rail, which causes the mercury to fall in it and rise in the other vessel until it reaches a wire and closes a circuit, which causes a small knife in the station to cut a square-cornered hole in the strip of paper which travels at an uniform speed, so that the time where any point on it passed the knife is known. The above firm have delivered 1,505 of the track apparatus, and 318 of the station apparatus.

The steamship "Buffalo," of the Wilson Line, plying between New York and Hull, is the largest carrier in the Atlantic service.

She was built at Jarrow, near Glasgow, by the Palmer Company. Her length is 425 feet between perpendiculars; breadth moulded 52 feet; depth of hold, 35 feet 9 inches; depth of hold to upper deck, 39 feet 11 inches; height between decks, 7 feet 11 inches. She has four decks, the two upper being of extra strong steel, a projecting keel, straight stem and an elliptical stern.

She is classed at Lloyd's 100 A1, special survey, four decks steel, such parts are of iron

as allowed by classing and survey rules of Lloyd's. She requires Lloyd's special survey certificate, the M. C. Builder's certificate, the Board of Trade passenger and the Suez Canal certificate.

Her gross tonnage is 5,500 tons; net, 2,960 tons, and she will carry 7,000 tons dead weight upon a moderate draft.

Her engines, also by the Palmer Company, are of the triple expansion type, with cylinders 33-inch, 54-inch and 86-inch diameter, and 60-inch stroke, steam is supplied by four (4) boilers, two (2) single and two (2) double enders, having eighteen (18) furnaces, fitted with the Fox pattern corrugated flue. During her last passage the indicator showed 5,003 horse-power, at the same time she was making 55.5 revolutions per minute, and 14 knots per hour, and yet she consumed only an average of 43 tons of coal per day.

Steam is admitted into the high-pressure cylinder at boiler pressure, 160 lbs. per square inch, from thence it passes into the intermediate cylinder at 80 lbs. per square inch, and when admitted into the third cylinder it has a pressure varying from $\frac{1}{2}$ to 1 lb. per square inch. The vacuum in this cylinder averages 27 inches of mercury. The consumption of coal is 1.5 lb. per horse-power per hour.

The vessel is fitted with eight special large winches, having two expansion engines, each of the tandem type, the low-pressure cylinder being between the high-pressure cylinder and the crosshead; these are also worked at the above boiler pressure and have special condenser and pump.

She has four masts, square-rigged on the fore and main masts; long poop and bridge combined extending 54 feet. She is divided by 12 bulkheads of steel and is fitted with cellular bottom for water ballast all fore and aft. The main deck is fitted to carry 600 head of cattle.

Great care has been taken in the numerous subdivisions of the various holds to provide against the possibility of the cargo shifting, which insures the success of the vessel as a grain carrier. Handsome and commodious accommodations are provided for 35 first-class passengers in a large deck-house at the forward end of the poop amidships. The rudder frames, of solid crucible cast steel, in two parts, have tapered pintles, brass liners, lignum vita bushing and two rudder stops.

She is fitted with direct steam windlass and all the latest improvements, combined hand and steam steering gear amidships, also screw-gear in the after wheel-house, where the

quadrant is fitted with an efficient and strong gripping gear for holding the tiller when disconnecting from steam to hand gear. The vessel is, moreover, lighted throughout with the Swan incandescent lamp, the masthead and side lights being also electric.

PERSONALS.

'76.

James M. Cremer, formerly with the Cummer Engine Co., is Mechanical Engineer at the Hydraulic Works, Brooklyn, N. Y.

'77.

Maurice I. Coster is on a visit to the States and has lately revisited his *Alma Mater*.

'79.

Wm. W. Dashiell is Secretary and Superintendent of the Bayonne and Greenville Gas Light Co., Bergen Point, N. J.

'80.

Theo. A. Elliott has severed his connection with the Noye Manufacturing Co. and may be addressed at 379 Pennsylvania Street, Buffalo, N. Y.

'84.

John A. Bense is Assistant Engineer of the Maintenance of Way Department, Pennsylvania R. R., Jersey City, N. J.

'84.

Lafayette D. Carroll is at the Jefferson Pressed Brick Works, Birmingham, Ala.

'85.

W. Harvie Wade is now with H. R. Worthington Hydraulic Works, Brooklyn, N. Y.

'86.

Otto Pfordte has accepted a position as draughtsman and designer with the Jonson Foundry and Machine Co., New York, N. Y.



During vacation it was rather difficult to find enough men in town to make out a nine. On Saturday, April 24, the following nine played

N. V. : Aldridge, c.; Ducommun, p.;
 ham, 1 b.; Sevenoak, 2 b.; Drummond,
 Morrison, s. s.; Sheldon, r. f.; H. Mac-
 , c. f.; Cotiart, l. f.
 ore by innings :

evens.....4 0 0 2 0 1 0 0 - 7

C. N. Y.....2 0 0 0 1 0 0 0 - 3

evens making 7 base-hits, 3 errors, no
 pitches, no passed balls.

Thursday, April 29, the nine was to go
 assessing, according to agreement made
 season. At the last moment, two decided

to go, and two failed to put in an appear-
 without even notifying the captain.

ever, the following seven went and played
 ctice game : Aldridge, c. ; Morrison, p. ;

ham, 1 b. ; Sevenoak, 2 b. ; Drummond,
 Hart, s. s. ; Taylor, l. f. The Watses-

, who had beaten the Jersey Blues, in
 ken, on the Saturday previous, only al-

l us to make four runs during the time
 they made thirteen ; this, of course, was

expected, for no nine can expect to win
 s if half of their positions are filled by

itutes. Those men who fail to appear
 the team is to play, should be fined, un-

they have a reasonable excuse, or else
 ed from the team to make room for those

will play.

crosse is still making rapid strides to-
 the front rank in college games and we

afe in predicting a high place for Stevens.
 ose who have watched the team while

icing cannot have failed to observe the
 st with which the men enter the sport,

the rivalry that exists in the struggle for
 ce on it. Passes and checks are made

a skill that would do credit to a profes-
 , while the staying qualities of the men

very noticeably improved. Many of the
 and Freshmen are looming up in great

, making our chances for champion in
 sport very encouraging indeed ; a game

played on the 20th of May with Har-
 when the students will have another

of seeing what the boys are made of.
 h this term comes the Spring games, a

e in all college athletics, and one which
 student should have at heart. The com-

: will do all that lies in their power to
 it a success, and if substantial aid is given

by the students, there is no reason why
 id not be.

rosse, May 15.—Lehigh, 0 ; Stevens, 1.
 e-ball, May 15.—Brooklyn Polys vs. Ste-

no match.



Columbia has beaten every college nine it
 has played with this season.

Since 1878, Henry Irving has realized over
 a million dollars from his acting.

We would recommend anyone interested in
 electricity to read an article entitled "Practi-
 cal Dynamo Building for Amateurs," which ap-
 peared in the last number of the *Electrician*
and Electrical Engineer.

An exchange defines a New York Alderman
 as :

"An exalted man
 Who keeps all he gets
 And gets all he can."

The first number of the *Amherst Literary*
Monthly was received last week. It is well-
 written, well-printed and everything about it
 points to its taking a high rank among college
 magazines of a *similar character*.

Owing to the increased size of the National
 Amateur Lacrosse Association, the Olrich Cup
 Tournament will be played in two sections
 this year. The first section on May 22,
 and the second section on June 5. The
 winner of the May section to play the winner
 of the June section during the afternoon of
 June 5.

The first of the middle-distance races
 between Myers and George for the champion-
 ship of the world was held on the first of May,
 in New York, the distance being 1,000 yards.
 It was easily won by Myers. Time, 2 min.
 23½ sec. The second race of ¾ of a mile
 was held on May 8, and resulted in a vic-
 tory for Myers.

The students of the University of Pennsyl-
 vania intend to produce on the 14th and 15th
 of this month the *Acharnians* of Aristophanes
 in the original Greek. The *Acharnians* was
 first produced at Athens in the year 425 B. C.
 This will be the first time that a Greek comedy
 has ever been presented in this country. The
 undertaking has been placed in the hands of
 a large committee of students, alumni, profes-
 sors and trustees, who are using every exer-
 tion to insure perfect accuracy in point of
 scholarship and detail.

If Harvard is to win the intercollegiate cup again, it will be through the efforts of Baker, '84, and Bradley, '86, repeating their previous performances. Chamberlain, '86, in putting the shot; Bemis, '87, in the mile walk, and Dean, '88, and the tug-of-war team as possible firsts; with a good number of second-rate men who may again, as they did last year, save Harvard from defeat.



A NEW FASHIONED GIRL.

She'd a great and varied knowledge picked up at a female college, of quadratics, hydrostatics and pneumatics very vast.

She was stuffed with erudition as you stuff a leather cushion, all the ologies of the colleges and the knowledges of the past.

She had studied the old lexicons of Peruvians and Mexicans, their theology, anthropology and geology o'er and o'er.

She knew all the forms and features of the prehistoric creatures—ichthyosaurus, plesiosaurus, megalosaurus and many more.

She'd describe the ancient Tuscans, and the Basques and the Etruscans, their griddles and their kettles, and the victuals that they knawed.

She'd discuss, the learned charmer, the theology of Brahma, and the scandals of the Vandals, and the sandals that they trod.

She knew all the mighty giants and the master minds of science, all the learning that was turning in the burning mind of man.

But she couldn't prepare a dinner for a gaunt and hungry sinner, or get up a decent supper for her poor voracious papa, for she never was constructed on the old domestic plan. —*Lynn Union.*

"Mr. Notes and Comments," writes Eva, "why is dying called 'kicking the bucket?'" "Don't know, dear, unless death is the *pail* destroyer."—*Ex.*

Student, arguing a point: "Professor, I'm sure I never saw the word before with that meaning." Prof.: "Let us congratulate ourselves that it is possible for you to learn something in this class."—*Argus.*

Prof. in Chemistry: "Give a practical illustration of the incombustibility of carbon dioxide.

Bright Student: "If you light your breath, it won't burn."—*Ex.*

STEVEN'S Athletic Association

TO BE HELD AT THE
ATHLETIC GROUNDS

—ON—
Thursday, May 27, 1886.

The following events will be hotly contested:

1. 100 Yards Dash,
2. 440 Yards Run,
3. 220 Yards Run
4. One-half Mile Run,
5. Throwing Lacrosse Ball
6. Standing Broad Jump,
7. Running High Jump,
8. Throwing Base-ball,
9. Putting the Shot, 16 lbs

Other events will probably be added.

AN ELEGANT SOLID SILVER MEDAL TO THE
WINNER OF EACH EVENT.

GLORY AND HONOR, ONLY, TO SECOND BEST

Entries Close May 25, - - Fee \$2.00

For further information, apply to Board
of Directors.

* THE * Stevens Indicator

Vol. 3.

* June, 1886. *

No. 6.

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HOBOKEN, N. J. :

* Stevens Institute of Technology. *

— RUSSELL BROS.' PRINT. —

THE STEVENS INDICATOR.

✧ THE ✧ ECCENTRIC. ✧

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STEVENS HIGH SCHOOL.

DEPARTMENT

SHRI VENKAT INSTITUTE OF TECHNOLOGY

ANALYST: J. L. HARRIS, JR. DATE: 10/10/68

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THE Stevens Indicator.

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HOBOKEN, N. J., JUNE, 1886.

No. 6.

THE SHOOTING STARS.

It was a glorious, starry night,
In splendor shone each star;
And as I stood and watched them all,
The near ones and those far;
From out the sky one bright star fell
And bade its friends a sad farewell.

And every other starry night,
When e'er to look I'd chance,
That empty space did glare at me
In heaven's broad expanse.
This ached my heart, it gave me pain—
And lo! another fell again.

And nightly, as I watched the stars,
Another seemed to fail;
It seemed as if they all would fall!
Such doom I did bewail.
"Oh, tell me starlets, tell me why
"You all forsake yon placid sky?"

And mark! the brightest of them all,
So humbly answer makes:
"Alas, we all are doomed to fall,
"When fate our bondage breaks!"
"Oh, must it be!" I then replied,
"That stars must leave each other's side?"

At last, in dreary solitude,
A single star was left;
It twinkled sadly down to me,
Of all its friends bereft.
I spoke; then prayed that it should stay,
But, no!—it dropt, and passed away.

And now, the whole of heaven's bare,
A vacant, empty space—
Oh! how I long their lot to share!
Does like doom wait our race?
No twinkling star can now be seen
A-glittering with majestic sheen.

Night after night I watch and watch,
Awaiting their return;
But all in vain I watch and hope,
In vain for stars I yearn!
"Oh! let them all be gone" I cry;
"With fancy's aid I shall espy
"A thousand starlets in the sky."

A. JASPER SWIFT.

THE CLASS OF '86.

Ant. Aguilera: A Cuban gentleman, always *en grande frisure* and waxed moustache; abhors all profanity—that is not his own.

John F. Arnold, C. E.: A graduate of the Troy Polytechnic Institute; knows everything—except himself; makes his feet constantly hug the ground when he walks.

Ed. T. Birdsall: The man with the full beard; will take electricity; is said to have obtained possession of the valuable *chest* wherein Noah had kept the antediluvian *nuts*.

C. D. Blauvelt: Loves to go out buggy riding with a girl at his side! otherwise quite innocent and charming.

W. S. Chester: The great organist, with the small vocal organ; at least, he never spoke loud when reciting; far above the rest of mankind; has a sweet temper.

C. R. Collins: Never drinks before 5 p. m., because the free lunch is not yet ready; quite literary; editor-in-chief of this sheet for several terms; a born critic, though not a borne critic; valedictorian of the class.

Ed. J. Cook: Represents foot and base ball, lacrosse, etc.; artist and student; a misogynist; spars so lively.

E. M. Cotiart: The Adonis with the slight whiskers; never succeeded in talking French like English; a great singer—leader of the Glee Club; renowned athlete and champion boxer; his voice, like Stentor's, can cross the Hellespont; loud enough to be heard in the "mind's ear" after C. has left for his native shore.

Hy. B. Everhart: The scholar; used to play base-ball; does not like Webster's dictionary; does not like to be nick-named; salutatorian of the class.

C. J. Field: Motto: "Business before Study;" well up in arithmetic; gives many receptions and postpones them; knows every "dog-gone" young lady of Brooklyn; is going to Canada!

William Fuchs, B. S.: Graduate of the College of the City of New York; poses as a cynic and succeeds well in satirizing himself; says that he was spoiled at the Institute; otherwise quite modest.

Ovidio Giberga, C. E.: Another Rensselaer man; now engaged on the Isthmus of Panama; is not afraid of fever; has a charming voice, and sings with the grace of a swan; the class picture shows him taking the high C.

Wm. L. Haynes: Came from Rutgers College; blushes at the mere mention of a skirt; but still likes dancing; does not like to be teased; started out with the project of rivaling "Birdie" in the beard line, but of course had to give it up.

John M. Heiskell: Dignity from head to toe, and toe to head; inventor of a monkey-wrench; judges of the politics, religion and other minor characteristics of others by the way they pronounce certain words; quite a modest philosopher.

F. E. Jackson: Does not like to draw trusses on cross section paper; otherwise very sensible; never indulges; gentle and stern, weak and energetic, sportive and solemn, he is bound to succeed, and success is bound to him.

M. G. Lilly: As pure and chaste as his namesake; was never known to blush; his whisper, stolen from the calm zephyrs of the night that rock and hum the lily to sleep!

Fran. La Pointe: A great politician, likes beer, but doesn't snuff; a quiet sort of lad who smiles supremely and serenely when he hears others howl; loves to hear Prof. Wood ask him whether he does "see the point."

John A. McCulloch: *le mecanicien par excellence*; no special mark, free from all vices and full of virtues. "He is a man, take him for all in all, etc., etc."

J. S. Merritt: Treasurer of the class; another of Mc's tribe; "too sweet for anything," when he puts on knickerbockers.

G. R. Metcalfe: The "Giddy;" beautiful chops, handsome beaver, and pretty cigar (?); the three characteristics by means of which he may be recognized; also, never refuses a drink when asked politely.

Fred. N. Morton: Metcalfe's twin brother; sometimes, but very seldom, found alone; loves music passionately; goes to bed with a "horrid" flute in his mouth, and a banjo at his side; very often "Giddy" takes the banjo's place. "Freddy" & "Giddy," now and forever, one and inseparable!

E. P. Mowton: a renowned yachtsman, bicyclist, and athlete; has but few idiosyncracies.—(Cont. in our next, after his leave.)

H. K. Morrison: the well beloved, homœopathic Morrison; his name will call up pleasant recollections to all that will remember it; sweet Morrison, thy base-ball time is over.

L. G. Paine: entered during the Senior year of this glorious class; hard worker and perfect man. [Don't know him well, you know!]

Wm. C. Post: always straight; captain of the lacrosse team; travels his time-beaten road, and cares, politely, for no one.

Otto Pfordte: the big "Ego;" the first man of '86 to catch a job; has some excellent ideas on lock-nuts, and so forth; a chemist who can analyze you into your minutest elements by merely looking at you.

W. W. Randolph: A beauteous blonde; hails from the South; likes the old Rock where the Rye grows; never kissed a girl without her expressed desire.

Ed. D. Self: ——— ——— ———!!

John R. Slack, A. B.: Graduate of Columbia; has some faults, I know, but I shan't tell you! "I'd rather choose to wrong myself, and you, than I will wrong such, etc."

W. W. Thomas: A fine sport; believes in the wise proverb: "You *must* look, but you *may* not touch!" Ask him to show you the New York "Oriental Pachyderm."

E. F. R. Varick: His winning countenance will soon be lost; is not an anarchist orator, according to his own authority.

1. *White*: Little "Ed," surnamed the "vee;" laughs merrily, talks cheerily, (verily!) and swears—like a major—"and" and by "Jinks."

2. *White*: A Mexican, with a great deal of *ia*; still, very often dances like a will-wisp; a "puffickt leedis man," with indrearies.

3. *Woodbridge*: Graduate of the Brooklyn Institute; musician, mathematician, electrician, mechanic, chemist-composition, and exhibition; these and many others combined.

4. *King*: (Pretty nearly forgotten, not in the list—but, oh, my!) has a prominent mustache and hair; has been offered excellent positions, but has not yet defied a destructive turn of mind; treats low students like a *Mentor* his *Tele-*
His variety is infinite.

DAMASCUS BLADES.

In the days of the Crusaders until a recent date, these remarkable weapons, though famous in all parts of the civilized world, have remained a mystery as far as the processes used in their manufacture are concerned; and all attempts to reproduce their properties have proved futile. Long before the Christian era the wootz of India was carried to Damascus, where it was worked, by hand, into blades which were the pride of the East; and, since the Crusaders, when seen (and felt) their wonderful perfection made them known in Europe, they have been considered, the world over, the acme of the armorer's art. Their keenness of edge, extreme hardness, their elasticity and the full display of prismatic color seen, by holding them in certain lights, and due to the bundles or knots of exceedingly fine crossing and recrossing at every conceivable angle upon their surfaces, are their chief characteristics. The first three of these have been imitated with more or less success by a series of experimenters, but the last defied emulation until about the year 1840, when Anosoff (of the Russian army) and M. Leitch conducted investigations—an account of which was published in the "Russian Mineral" magazine—that led to the full comprehension of the subject. They did not, however,

attempt to produce the desired effects by using the Indian steel, or wootz, which is obtained by a very primitive process; but, having analyzed this, produced a metal having its essential qualities. Working this by very complicated modern methods, with the aid of the most perfect modern machinery and with all the experience of modern science, they succeeded in making blades possessing the same qualities, though in not quite so marked a degree, as those made at the simple forges of the armorers of a semi barbarous race, upon whom the Roman people looked with scorn.

The process referred to above, by which the wootz is obtained, is as follows: The iron, gotten direct from the ore (a magnetic oxide, yielding only 15 per cent.) is put into crucibles of clay and 10 per cent. of dry wood, in small bits, added. This is covered with two or three green leaves, and the crucibles are then carefully stopped up with moist clay to exclude the air. From twenty to twenty-five of these, each holding only a pound of iron, are placed in a blast furnace fed with charcoal and kept at the highest temperature of which the furnace is capable, for about two hours and a half. They are then taken out and cooled, after which they are broken and the steel obtained in little lumps. Of these lumps, only those whose surfaces are smooth and regular are retained, roughness indicating a poor quality of steel, and these, being too brittle, are melted again and kept at a red heat for several hours, when the steel is ready for use. An excellent specimen, procured by Gen. Anosoff, was analyzed by M. Ilmoff, with the following result: iron, 98; carbon, 1.31; sulphur, .014; silicon, .5; aluminium, .055; copper, .3; and traces of silver.

The investigation of Gen. Anosoff led to the establishment of works at Zlatoust, in the Ural mountains, where blades, having the properties of those of Damascus, are manufactured by a process of his invention. The crucible, having been charged with about 11 lbs. of iron, very malleable and ductile, $\frac{1}{12}$ as much pure native graphite, $\frac{1}{8}$ part of scales of iron, and $\frac{1}{4}$ part of dolomite as flux, is placed in the blast furnace, where it is kept for five hours, when three-fourths of the graphite will have disappeared and a net work of fine lines will be visible on the steel. When the fuel in the furnace is exhausted and the crucible becomes cool, the latter is taken out and the lump of steel, weighing about 11 pounds, and presenting a surface of uniform appearance, is obtained. This is drawn out under

a hammer, from three to nine heats being required for the operation, after which it is cut into three pieces and each piece forged again separately. As the lower side of the original lump is better marked than the upper, care is taken in forging to preserve the distinction between the two, that the cutting edge of the blade may be made from the former. The iridescent appearance is brought out by washing in a solution of sulphate of iron containing a certain quantity of sulphate of alumina, after which it is repeatedly washed with soap and water, and wiped dry.

These blades resemble the real Damascus in all essential particulars, and the establishment at Zlatust, became celebrated for their manufacture during the life of Gen. Anosoff. Since his death, however, which occurred in 1851, his successors have been unable to sustain the reputation of the works; and it is supposed that he had always kept part of his process a secret, and that it died with him.

M. B. G.

DIANA LOUIEZER.

A PLAY IN NOT QUITE SO MANY ACTS.

Adapted from the German by T. Dingus Kehoe.

DRAMATIS PERSONÆ.

LOOPHOLE, A Kid, going on twenty-one.
 ETERRHENI FIRSTIN, His mother, owner of the Brewery.
 GOSHDARN FUSSE, Rascally Plumber, and heavy Dealer in Coal, Wood and Stationery.
 DIANA LOUIEZER, His daughter.
 MARQUIS DE SHELLAC, Dishonest Undertaker to the Brewery.
 RUBBI-DUB-DUB, A Police Captain.
 JORRGE, Plumber's Assistant, Third-rate Villian, in league with Shellac.
 FISH }
 FRUIT } Beggary Plumbers.
 VEGETABLES, }
 Uneducated Brewers, Mobs, Degraded Aldermen.

ACT I.

SCENE.—Dark corner in FUSSE's shop.

DIANA, *scraping pipe-tacks.* JORRGE, *stealing stationery.*

JORRGE. Hock? Diana, Hock? What know I of hock? You charge me with hocking your father's rubbers and say you saw the check protruding from me vest pocket. Diana, why seek you to turn from me love? Methinks the vulgar brewery chump hath pried into the ground floor of thy affections and thrust me out. But nay! It cannot be; it must not be. (*Gets very heavily excited.*) Oh, gaeurl, me heart—I—Ohwowjoo joplumbago . . . (*Struggles violently with a porous plaster on his left breast.*) Oh! Diana,

say, will you not be me own? (*Kneels excitedly on three pounds of putty and ruins his spring pants.*)

DIANA. (*With pale blue emotion.*) Jorrgge, avast! Drive me not to violence. I have a loud, strong breath and can defend myself. Beware thee, Jorrgge—Beware! I will not take your love; not even with a pound of tea beside. Nay, leave me! (*Waves her foot gracefully towards the door.*)

JORRGE. (*Arising with deep-dyed villainy stamped and embroidered on various parts of his countenance.*) Aha! Then, Diana, you reject me love? The die is cast. You yet shall rue with big salt tears of imitation anguish the day when you cast the jewel of me love away. (*Exit.*) (*DIANA continues to scrape pipe-tacks reflectively.*)

Enter LOOPHOLE.

LOOPHOLE. Oh, Diana! So long. (*Exit.*) (*Re-enters in four augenblicks.*) Now you see me! Now you don't! (*Falls unexpectedly down the cellar stairs.*) DIANA gives several cries but not any of them wild and piercing. Runs to the stairs.)

DIANA. Oh, Loophole are you damaged?

LOOPHOLE. (*From below.*) No, but I lost a wooden toothpick. Bring two boxes of matches while I find it.

DIANA. Tarry not there. Methinks I hear my father's footsteps approaching on horseback. (*LOOPHOLE comes up from the cellar.*)

LOOPHOLE. Diana, I saw the plumber pup on yonder corner and methought he looked as though he sought gore, and—but hold! I see also upon your face four consecutive shades of agitation. Has the mongrel guttersnipe disturbed thee?

DIANA. Aye, Loophole, and I would have kicked him with my number nines had I known that you were near. But I fear there will be trouble brewing.

LOOPHOLE. Yes; there is. We brew it daily at the brewery.

DIANA. Huyler, once again, Loophole. Fresh every hour. But I mean that I rejected Jorrgge and he will work us ill. He said the same.

LOOPHOLE. Nay, Diana. The foul snoozer shall not thwart us. I will grasp him by his paper collar and thrust him nearly three feet from me. I shall fix things up. Depend on me.

DIANA. Oh, Loophole, let me lay my head upon your lofty shirt front. (*Lays her head upon his high-priced dirty shirt cover with nothing but a false bosom under it. He embraces her and wonders if he has cash enough for two sodas. Lengthy pause, in which JORRGE, FISH, FRUIT, and VEGETABLES, look in at the window and take in the proceedings. After which they take all the lead pipes and supplies within reach. JORRGE makes a noise, LOOPHOLE looks up and perceives him.*)

LOOPHOLE. (*Jumping six and three-quarter feet.*) See! Jorrgge, the guttersnipe! (*JORRGE vacates very hastily.*)

DIANA. Great Phoebus! We are wrecked. (*Faints dead away on two and a half-dozen gas globes.*)

* * * * *

ACT II.

SCENE.—Back part of the Brewery. SHELLAC and JORRGE conversing.

JORRGE. Now, Sir Marquis de Shellac, you say your business has been dull of late, because the beer is brewed too pure, and hence there are not funerals enough.

SHELLAC. Even so, and I know not wherewith to boom things.

JORRGE. Yes, but I do, I am a plumber. Aye, a regular snyde plumber. I can go beneath the brewery and tinker with the plumbing and fix things so the vulgar sewer gas will mingle with the beer, and then, sir, funerals will start in first-class shape. (SHELLAC gets highly elated. Turns three hand springs and dances one double shuffle.)

SHELLAC. Most noble plumber; and will you do it?

JORRGE. Aye, if you will do for me. Young Firstin has robbed me of me fair one, and I seek revenge. Help me to revenge; to drag him down, down to the depths of degradation and I will tinker with the plumbing.

SHELLAC. Agreed.

JORRGE. Then first I'll tell you of what I lately saw between them. (*Exeunt, talking.*)

* * * * *

ACT III.

SCENE.—*Luxurious up-town apartments of ETERRRHENI*
FIRSTIN ETERRRHENI seated at an aged piano with every other note gone, playing the "Brewer's Quadrille," concocted by herself. Enter SHELLAC unattended by a valet.)

SHELLAC. Madame, oxskuse me. I came to talk of a little matter regarding his nobbishness, your son.

ETERRRHENI. Proceed; I am acquainted with me son somewhat and I supply him with spondoulux occasionally.

SHELLAC. Your son is on the B-line to ruin. One Fusser, a rascally plumber has a daughter who has beguiled Sir Loophole. When he visits her, she engages him in conversation while her father steals around and purloins various articles from his person. And they even go so far as to treat him to your own beer. The couple must be arrested. Let us proceed at once to procure liberty and justice and a seventy-five cent warrant.

ETERRRHENI. Oh, geursh! can this be? Excuse me while I put on my rubber boots and my cast iron basque, trimmed with zinc. (*Exit for a few minutes. Re-enters and exit with SHELLAC*)

* * * * *

ACT IV.

SCENE. *Front door FUSSEER'S shop. FUSSEER smoking a three for five. Enter JORRGE, FISH, FRUIT and VEGETABLES.*

JORRGE. Good morning. Mr Fusser, will you come inside for four hours while I talk with you on business that don't concern you in the least?

FUSSEER. Oh, certainly. don't mention it. Just wait two years while I infect the neighborhood a little more with my Havana.

JORRGE. With pleasure; no hurry. (*Grabs FUSSEER by the pants and drags him all over the shop.*) Nice weather for exercise. I came to see you about a little matter regarding your daughter. I feel that you ought to be informed on the subject. There comes to see her, daily, a vile brewery waif, and not only is he of a low extraction, but he is a thieving villain. But yesterday these gentlemen here, and myself, saw him swipe lead pencils from the stock while he was here and Diana was in charge. He is a base, chrome green villain. Rise up against him. Let us go this very eyewink and procure a warrant for his arrest.

FUSSEER. Jorrge, I thank you, accept a little, mean, insignificant token of my gratitude. (*Hands him a loaded cigar; two cent sizzler, with horse hair and bad saltpetre filling*) I will have the villain arrested at once. Let us be off for a warrant. (*Exeunt.*)

* * * * *

ACT V.

SCENE.—*Front of FUSSEER'S shop. FUSSEER soldering his suspenders; JORRGE sweeping out. The morning sun (price two cents), stealing all over the landscape.*

FUSSEER. Now, Jorrge, let me recline me orbs on the base human lump that seeks to ruin me. With four cops and a gilt edged warrant in the back 'oom his doom is sure. (*Winks his ears satisfactorily.*)

JORRGE. Aye, the villain is entrapped. (*Smiles a big tin smile of insatiate villainy. Rumble of wheels. Enter brewery wagon containing SHELLAC, ETERRRHENI, RUBBI-DUB-DUB and a gang of UNEDUCATED BREWERS.*)

ETERRRHENI. (*Turning a hand-spring out of the wagon and rushing at FUSSEER, thirty-two miles per hour.*) Haa! Hoo! Hee! Base hummer I have you. (*Grabs him by both ears and bumps his head at the rate of seventy-six times a second against the brick wall. Enter LOOPHOLE, much amazed. FUSSEER perceives him and breaks loose; falls with a dull thud upon him.*)

FUSSEER. Hi! Ragged ruffian, at last. (*Blocks his stiff hat and hits him a poke on his false shirt front. Grand right and left. COPS, BREWERS, PLUMBERS ETERRRHENI gets FUSSEER down and jumps up and down on his neck; LOOPHOLE paralyzes JORRGE; rocks, sticks and Dutch profanity. PLUMBERS and BREWERS heave lead pipe, coal, wood and solder. Enter fifteen thousand assorted populace. RUBBI-DUB-DUB bawls one lung out. COPS and RUBBI-DUB-DUB finally stop the riot.*)

RUBBI-DUB-DUB. What means this howling riot?

FUSSEER. (*Crawling up from the cellar way.*) There, behold the villainous instigator! (*Points to LOOPHOLE.*)

LOOPHOLE. (*Gathering up his snyde jewelry from the surrounding landscape.*) Nay! But there, see the mongrel pup that first barked. (*Points to FUSSEER.*)

DIANA. (*Rushing in out of breath.*) Seize the bow eared knaves. (*Points to SHELLAC and JORRGE.*) I overheard them talking of a base scheme and this is the result. I have run all the way from Morristown N J., but alas, too late. (*Sinks in several distinct heaps upon the ground and gives JORRGE and SHELLAC dead away. They are seized and after full explanation ETERRRHENI approaches FUSSEER.*)

ETERRRHENI. Fus, old fel., excuse me for treading on your jugular, but I was laboring under a delusion.

FUSSEER. Oh, certainly Et., certainly; don't mention it. I beg you to give me your tin breastpin as a token of this pleasant occasion. (*ETERRRHENI gives him the pin.*)

LOOPHOLE. Ah, Fusser, now gaze into my four een carat countenance and say the fair Diana can be mine.

FUSSEER. Take her, Loophole. Aye, and even more: a load of wood and one package of note paper with her. (*Leads DIANA to LOOPHOLE.*)

ETERRRHENI. (*To the BREWERS.*) Geester heim: Auf dee brewery hineingogoen an. (*Exit BREWERS.*) (*To FUSSEER.*) Come, let us all to the dime restaurant and roll in luxury in honor of the occasion.

ALL. Well! Now! (*Exeunt.*)

CURTAIN.

JOHN, ROBERT, AND EDWIN A. STEVENS.



COL. JOHN STEVENS.

One of the greatest engineers living at the commencement of the present century, without having been the first to propose navigation on land or sea by steam, yet exhibiting a far better knowledge of the science and art of engineering and holding more advanced views in regard to the importance and capabilities of the steam engine, was Col. John Stevens. He was born, 1749, in New York City, but became a resident of Hoboken, N. J. His attention was directed first to steam engineering, by seeing, in 1787, the imperfect steamboat of John Fitch on the Delaware River. Familiarizing himself with this new and curious combination, he became an unwearied experimenter in the application of steam to locomotion.

In 1804, three years before Fulton's steamer, the "Clermont," plowed its way up the Hudson, Stevens had constructed a steamboat which, by the principles involved, was destined to become the parent of the modern Atlantic steamship. This boat was propelled by a pair of twin screws, and was furnished with steam at 50 lbs. pressure by a sectional boiler. The machinery of this boat, as here illustrated, is to be seen in the Library at the Institute.

The success of this, and of a second built in 1806, although the knowledge of them was confined to a limited circle, was such that Stevens was encouraged to construct a larger steamboat, the "Phoenix," a screw propeller, which was brought out closely after the completion of Fulton's side-wheel boat, and made a successful trip to Albany in August, 1807,

only a few days after the voyage of the "Clermont." A law passed in New York gave to Fulton the monopoly of the waters of the State; so in 1808 he sent his boat, in charge of his son, Robert L. Stevens, around into the Delaware, thus making the first sea voyage in a steam vessel. Here the "Phoenix" proved a success.

In the year 1812 he urged the construction of a railroad to connect the Lakes with the Hudson River, insisting upon the economy of first cost and maintenance as well as the speed of transportation, as contrasted with the canal then proposed. At that time not a locomotive existed in any shape. A few short tram-roads were in existence, and, for transportation, wagons with ordinary wheels turning on axletrees were drawn by horses. The wagons were prevented from running off sideways by a raised flange on the outer edge of the rail. He published, May, 1812, a pamphlet, making public his views and calculations respecting the feasibility of applying steam to locomotion on land, and the precise mode of such application. He describes precisely the principles of the modern railroad; the non-condensing locomotive with tubular boiler, its wheels fast on the axle, and the flanges on the inner periphery of the wheels. He writes: "I can see nothing to hinder a steam carriage moving on these ways with a velocity of 100 miles an hour," but adds: "This astonishing velocity is considered here as merely possible. It is probable that it may not, in practice, be convenient to exceed twenty or thirty miles an hour. Actual experiments, however, can alone determine this matter, and I should not be surprised at seeing steam carriages propelled at the rate of forty or fifty miles an hour. In 1838 this great man died, whose



BOILER, ENGINE, AND TWIN SCREWS OF STEAMBOAT BUILT BY JOHN STEVENS, 1804.

enlarged liberal and progressive ideas placed him far in advance of the times in which he lived.

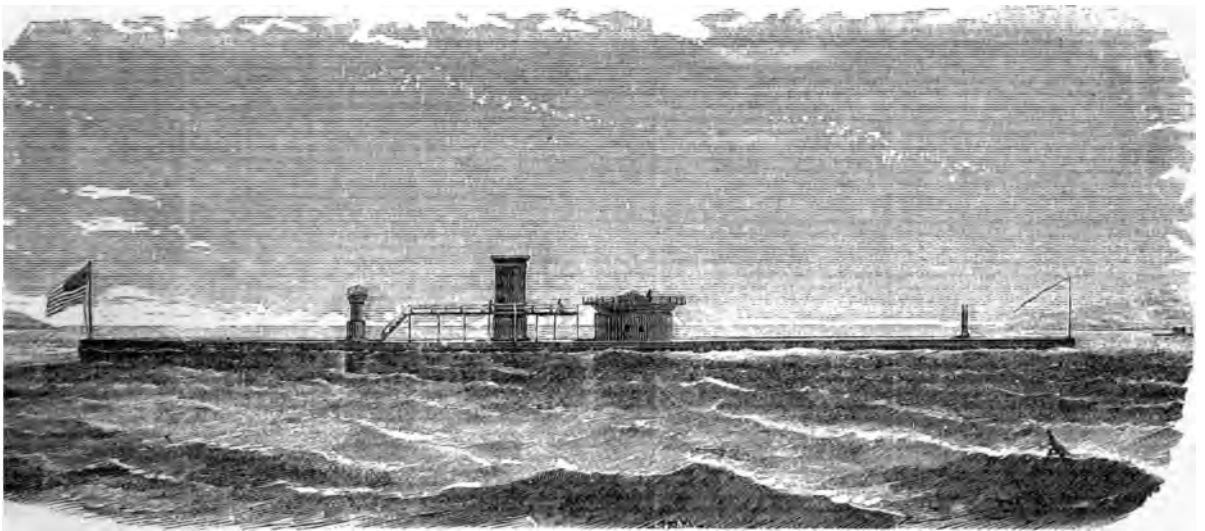


EDWIN A. STEVENS.

Robert L. Stevens, his son, was born in 1786, and, when a boy, worked in the machine shop at Hoboken. He devoted his whole life to experimental philosophy, the results of which have been of great public benefit. He was associated with his father in many important experiments. In 1814 he launched the steamboat "Philadelphia," which attained the then wonderful speed of 13½ miles an hour. He determined and introduced

into his practice the forms of least resistance and the graceful water lines to which so much attention is now paid. In this steamboat he employed the expansive working of steam. In 1822, when Fulton introduced steam ferry boats, Stevens built one which was the first of the now standard form. Here he substituted for the heavy, solid cast-iron walking-beam, the skeleton, wrought-iron walking-beam now in universal use in America. In 1827, on the steamboat "North America," he applied the *hog-frame*, consisting of the large timbers on the sides, to prevent the boat bending in the centre.

An invention of great importance was that of the *Stevens valve-gear*, the joint work of Robert L. Stevens and his nephew, Francis B. Stevens, in the year 1841. In the same year he invented the double slide cut-off for locomotives and large engines. This, besides the general use on the river boats built in New York, is in use on the great locomotives of the Central Pacific R.R. The first locomotives used on the Camden and Amboy R.R. were built from his plans. He corresponded and exchanged ideas concerning locomotives, with Robert Stephenson. He invented the universally used T-rail, and as his design was pronounced in Scotland, an impossible one to roll, he went abroad to show how it was to be done. In 1843 he designed an iron clad war vessel to be 250 feet long, but in 1854 such progress had been made in



THE STEVENS IRONCLAD BATTERY.

naval engineering, that he abandoned this and laid down the keel of a ship of much greater size and power. This was the famous "Stevens Battery," which was described in our April number. He upheld, from the beginning, the principle now recognized, that a smaller number of the largest guns should be employed, rather than a larger number of small guns. Acting in accordance with this principle, he provided, on his iron clad, for the mounting of the largest guns that could be constructed at the time, to be worked on turntables. His death occurred before the vessel could be finished, in the year 1856.

Edwin A. Stevens, born in 1795, and James C. Stevens, who had taken an active interest in their brother's great work, attempted to secure from the government authority to complete the ship. Mr. Edwin A. Stevens, died in the year 1868, leaving the task still unaccomplished. In his will he left funds to finish the work. It was decided to introduce radical changes in the vessel, and to rebuild it into the monitor pattern, as shown in the illustration. The funds, however, proved insufficient to finish it on the elaborate scale proposed, and so the work stopped. This noble vessel, with its possibility of becoming the fastest war steamer in the world, the most powerful steam ram, the fleetest of torpedo ships, and the most formidable of iron-clads, contrary to the recommendations of Prof. Thurston and other eminent engineers, was sold, and broken up in 1880, as before described. By far the greatest work of Edwin A. Stevens, was the founding of an "Institution of Learning, for the benefit, tuition, and advancement in learning of the youth residing in the State of New Jersey." He left, in his will, funds for the accomplishment of this design, and appointed trustees for its government. It was his intention, as he expressed it, that this Institution should be perpetual. The first catalogues of the Institute announced that the executors, in view of the existing needs of the country at large, and of the personal interest always manifested by Mr. Stevens in the development of the mechanic arts, had determined that the Institution of Learning should be a school of Mechanical Engineering. It was determined to make this of a high educational order and to involve a general and not a merely industrial training; it was thought best also in memory of its munificent founder, to call the new school the STEVENS INSTITUTE OF TECHNOLOGY.

ALBITAN.

A SHARP RAILROAD CURVE.

The sharpest railroad curve in the world, for standard gauge track, has lately been constructed on the Providence, Warren and Bristol R.R. The curve was constructed to do away with the old method of backing out of Providence and switching on to the main track. Portions of this description are quoted from the *Railroad Gazette*.

In order to minimize an enormous amount of excavation, necessitated by the close proximity of a steeply sloping bluff 130 feet high, this very sharp curve was adopted. The radius of curvature decreases every fifty feet until the minimum radius of 211 feet is reached, at the end of this curve the radius increases every eleven feet until the tangent is reached. The whole curve has a sweep of nearly 180 degrees. To enable the eight wheelers to traverse the curve, the flanges are taken off the front drivers, and the width of tire increased to seven inches. A third and fourth rail is laid on the inside of the curve for the blank wheel to run off on. The locomotives ride much easier, and are much easier on track since the flanges have been taken off. The weight of the rails is seventy lbs. per yard. The third and fourth rails are bolted to the main rails with braces between. The two rails thus joined are laid as a single rail and furnish more than double the usual bearing upon the sleepers, thus making a particularly rigid curve. The road-bed is heavily ballasted with broken stone. Every engine of the road has traversed the curve with perfect ease, and a train of seven empty cars has been backed around it by an engine with only sixty-six lbs. of steam.

An engine has also been built for this road, especially adapted for such curves. It is of the type of the bogie or two cylinder Fairlie engine, and is named the "Pokanoket." In making a test on a curve roughly laid in a ballast hole, the "Pokanoket" passed round a curve of 193 feet radius (thirty degrees) with ease, while an engine of the usual American type spread the track so badly that the trial had to be discontinued. The "Pokanoket" has, strictly speaking, three trucks. The forward truck has two wheels only. The centre truck has four wheels, drivers, and carries the cylinders. The hind truck has six wheels. The forward bogie or driving truck consists of two pairs of drivers coupled and a two-wheeled leading truck, the latter arranged so as to be adjustable to any desired curvature of track.

keep the flanges of the forward drivers on the rail as may be considered when running ahead. The rear bogie or truck is made centre-bearing, with side springs to prevent rocking, and springs to transmit the weight to the rails. The weak point of the Fairlie engine has been the steam pipe joints. As the rods and drivers are mounted on a truck with swiveling motion in relation to the rails, it is evident that the steam pipe joints are free to swivel, and that they will have an angular motion in passing around the curve.

In engines built under Mr. Fairlie's design, these joints always gave more or less trouble. Mr. Meats, of the Mason Machine Works, the designer of this engine, has overcome any leakage by means of a joint of somewhat peculiar construction, in the steam pipe. These joints possess, to a certain degree, the properties of a ball and socket joint, and are held together by two bolts diametrically opposite each other, passing through flanges set off on each side of the pipe. Spiral springs upon the bolts between the nuts and the flanges, maintain a constant pressure upon the joints and furnish the elasticity. As the steam pipes do not revolve about the centre pin of the truck, they are directly accessible at all times, and the motion of the truck centre is much simpler.

To prevent wear of the main driver when running tender first, a heavy ad-justing spring lever is thrown into gear, by which the tender truck guides the main truck in a manner similar to, but slightly different, than that in which the forward truck of a standard engine guides its drivers when running ahead. This arrangement makes the engine remarkably steady when running in reverse, as compared with a standard engine. In fact, about as easy as a passenger

Following are the general dimensions :

diameter and stroke.....	16 in. X 24 in.
diameter on tread.....	56 in.
.....	4 ft. 8½ in.
.....	Soft coal.
se, total.....	35 ft. 0¼ in.
steam truck.....	14 ft. 0 in.
driving.....	7 ft. 0 in.
front truck.....	12,500 lbs.
drivers.....	61,800 lbs.
hind truck.....	52,000 lbs.
Total in working order.....	126,300 lbs.
force per lb. average pressure in	
boilers.....	109.7 lbs.
capacity.....	2,000 gallons.

A. A. F.

REMARKABLE SAWS.

The attentive readers of the STEVENS INDICATOR will have noticed, in its April number, an interesting article, headed "A Saw Without Teeth." In addition to this article I will state a few facts, which bear upon the same subject.

Apparently it was an American who made the discovery, that if circular saws are intended for cutting metals or other hard substances, the teeth can be dispensed with if the saw runs at a very high rate of speed.

The most remarkable feature of many of this kind of machines is that the cutting substance is much softer than the substance to be cut; *e. g.*, steel may be very easily cut by means of an iron saw. This fact appears to have been known at least about forty-five years ago. At that time there existed, in London, an institution whose object it was to show and demonstrate to the public new inventions and scientific discoveries. Its name was "The Adelaide Gallery," an institution similar to the still existing Polytechnic Institution. Important experiments were often made there, until strong competition compelled its managers to give up the business.

The experiment in question was announced as "Cutting a well tempered razor blade by a piece of cardboard." This was actually done. A disc of cardboard of about 26 inches diameter was made to revolve, as was then rudely estimated, twenty times a second. It cut a groove of three or four millimeters into the back of the razor blade; glass rods and pieces of marble were also cut through. Nothing was done in regard to the experiment until thirty years afterwards, when an American invented a saw for cutting steel, based on the same principle.

A few years later, Mr. Reese, of Pittsburgh, Pa., constructed a circular saw without teeth, about 3-16 in. thick, and 42 in. in diameter. This disc made 230 revolutions in one minute, while the thick steel rods were made to revolve 200 times per minute in a direction similar to that in which the disc turned. The rods became extremely hot, while the disc rose only a few degrees in temperature. Moreover, the cut itself was 5-16 inches wide, all of which tends to prove, that strictly speaking, it is not the disc itself, which cuts the steel, but the air carried along on account of its rapid rotation.

WAT.

THE STEVENS INDICATOR.

the Stevens Indicator.

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CORNELIUS J. FIELD, '86, *Business Manager*.
LUCIUS T. FINCH, '89, *Exchange Editor*.
CARTER H. PAGE, '87. BURTON P. HALL, '88.
ROBERT G. SMITH, '88. ARTHUR A. FULLER, '88.

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The editors do not hold themselves responsible for opinions expressed in literary articles or communications.

THE athletic reporter of the *Tribune* is incompetent and malicious. We couple these epithets, because, if we can prove the latter, the former must hold true as a natural inference. A few weeks ago the New York University played Stevens at lacrosse. A dispute arising during the game, the various reporters present were requested in a gentlemanly way not to say more than was necessary to a truthful representation of the game. In the same gentlemanly manner the reporters acquiesced, with the exception of the *Tribune* representative, who threatened to "fix up" one of the disputers in the Sunday *Tribune*. Upon being reminded that this paper had always done its best to injure foot-ball the reporter behaved so insolently that the college man lost

his temper and offered to "fix up" the representative of that mud-slinging sheet. With the sneaking cowardice characteristic of men of his type, the latter hurriedly declined and went his way unmolested, muttering all sorts of wild threats.

We mention this incident as a sample of the fairness of the *Tribune*; and our reason for including the Editor as well as the penny-a-liner is this: For three consecutive years the *Tribune* has published an editorial condemning the rough and brutal playing of the college lacrosse teams—that of Stevens in particular—and stating that the North of Ireland men would show us how the game should be played. The writer of that editorial knows nothing whatever of lacrosse. Follow his suggestions by forbidding body-checking, and what sort of a game would we have? We pardon the editor's pride in the lady-like playing of his countrymen who, he hopes, can teach us how to play; but a pen in the hands of a man utterly ignorant of his subject plays much mischief among the ignorant and holds the writer up to the ridicule of the initiated.

We feel perfectly free to say all this, for the *Tribune* has spared no endeavor to injure athletics at Stevens; and it is only fair to those who are unfortunate enough to be obliged to read such reports that this statement of facts be made.

INDICATOR CARDS.

Several months ago we took occasion to mention the dilapidated condition of the blackboard erasers in the engineering room. At present we call attention to those in the mathematics room. There are, perhaps, two which are in good condition. We have not even the old blocks on which to stretch our handkerchiefs. The amount of time wasted while waiting for a chance at the rubber is enormous. Now that the spring games are passed, perhaps a collection might be taken up among the students to provide a new lot of erasers. If not, the faculty might hire out the campus to Buffalo Bill and the Kickapoo Indians for circus performances. By this

after O. W. J. had been properly cared for, there will be something left for the purchase of supplies for next year.

During the summer the INDICATOR is to be repart and thoroughly cleaned. Several alterations of design will probably be made.

This is to enable it to work more efficiently as well as to improve the appearance. While we promise no great change, our readers may rest assured that we will use every means in our power to increase the usefulness of the INDICATOR.

PERSONALS.

'83.

Miss E. Sague is now with N. Y., L. E. & Co., Dept. of Tests, Susquehanna, Pa.

'84.

Edward L. Fearn is reporter for the "Brooklyn Eagle," Brooklyn, N. Y.

'85.

Miss Beatty, Jr., may now be addressed at Morgan's Wharf, Baltimore, Md.

Mr. G. Smith is with Warden & Mitchell, Architects, Philadelphia, Pa.

Mr. A. Adriance, with Adriance, Platt & Hughes, N. Y.

SOCIAL.

"S. S. S." was organized in 1885, and has ever since been in a flourishing condition. Officers for the season of '85-'86: W. F. '86, President; A. Aguilera, Jr., '86, Vice-President; T. Taylor, Jr., '88, Treasurer; M. Blankenship, '88, Secretary.

Members from all four classes:

Total number 28
The first dance of the season was held in the hall, February 24, and opened a successful season. The second was a German, on March 8, in the "Physical Laboratory," which was kindly granted by Pres. Morton, and for this particular occasion but also used to follow. Dr. Geyer manifested interest by placing eight Weston incandescent lights of one hundred candle power

each, to illuminate the room. The effect was brilliant and everybody was delighted. Mr. Matthew Lackland superintended the engine and dynamo, which proved to be objects of no little interest to the participants in the dance. The third dance was also a German, held as before, in the Phys. Lab., and was of about the same character and general interest as the second dance, about sixty being present. The fourth and last dance was a Favor German, in the Phys. Lab., and was the most successful of the season. The favors, furnished by the chaperones, were numerous and beautiful. Refreshments, as usual, added to the enjoyment of the occasion. The students and fair maidens glided gracefully over the polished floor until the wee small hours of the morning, and thus ends the second season of the "S. S. S." The Germans were led by Mr. J. Day Flack, '87. Mrs. Morton, Mrs. Stillman, Mrs. Elder, Mrs. Besson and Mrs. Waefelaer have kindly acted as chaperones, and have added much to the enjoyment of these occasions. The "S. S. S." would again here express its thanks to all those who have lent them their aid, and especially to Pres. Morton, Prof. Mayer and Prof. Geyer, for their kindness in loaning and lighting the Lab. for our use.

There is one other social event, which, although not connected directly with "Stevens," is nevertheless of much interest to many of the students residing in Hoboken. This is the annual entertainment given by the "Helping Hand," a society composed of ladies from every church in Hoboken, who, as the name indicates, do indeed extend a helping hand to the poor of Hoboken. Being thus a society of all the churches, some of our professors and their wives are much interested, as should also be the students residing here. May 6th, this society gave the Japanese Tea. The holder of each ticket was entitled to a cup and saucer. The German Lutheran Church was profusely decorated with Japanese lanterns, banners and fans, which, with many other beautiful articles of Japanese origin, were on sale. But the most attractive objects of the evening were the delegations from each church, of four or five young ladies, dressed in Japanese costumes. With hair dressed high, with flowing skirts and sleeves ornamented with brilliant colors, quaint figures, cute little fans, rats, mice, etc., these fair damsels flitted to and fro serving the refreshments and selling their wares. Not a few students were present, and the affair was a complete success.



Say, boys, don't Kegebehn's beer stands make good ash receivers?

It has just been developed by a Soph. that a new property of angels is phosphorescence.

During the past week one of the students made a very interesting discovery. He found that mercury is in the solid form when frozen.

Some startling statements in chemistry by '88—Lead acetate = acetic acid. While lead is most largely used in manufacture of face-powder.

The man who don't know all about Bible History don't get along very smoothly in Paradise Lost. That means the class don't get along smoothly.

The man who translates the German word "bald" as having the meaning of the same word in English, is very likely to get what the boys call "balled up."

"Here's to Eighty-six, drink her down!"

Why doth the little reckless Prep.
Delight to swear and chew?
Why, simply 'cause he wants to act
As other Mickies do.

Logical definition of *chair* by Prof. W—l:
Species.—Chair.

Genus.—A movable seat.

Difference.—A seat *intended* for one person.

Last week when the word "*Zugabe*" was analyzed and found to mean that which is given in addition, one of the class suggested that it might be an appropriate name for free lunch.

This is the season of the year when the man in Math. stands in line for the one blackboard rubber and after enjoying one rub with it, does the rest of his erasing with his coat sleeve and fingers.

The new cherub is yet young and innocent, and totally unused to things generally. He has a faculty of coming into Prof. Kroeh's room during recitation and asking for Prof. Riesenberger.

Prof. W—l draws the line of distinction between literary and non-literary language

when a student uses such expressions as "Well, Milton had been *pretty rough* on the Royalists, etc."

In chemistry lectures Prof. Leeds is wont to hold up precipitates that no one in the class ever saw before, and say: "Now you see, I have obtained the substance, the appearance of which is so familiar to you."

Deak is very homesick. That is, he practised a Dutch swear-word until he had the toothache, and then he applied for leave of absence to go South and recuperate. However, one bottle of St. Jacob's Oil has braced him all up again.

A short time since the New Jersey came within an ace of running down the Weehawken. If the New Jersey only knew what a favor she would have conferred on suffering humanity, she certainly wouldn't have missed such a valuable opportunity to benefit the race.

The City of Hoboken ought to have one decent city appurtenance for a short while and then go into hopeless bankruptcy. At a fire which occurred recently in Hoboken, one of the '86 men who happened to be on hand, had to show the firemen how to couple the hose to the engine.

The Preps. appear to be well supplied with money. The other day two baby Preps. were indulging in a sparring match, to the great delight of their overgrown brothers, who were making bets in the most reckless way. The Prep. will be pretty "tough" by the time he's a freshman.

"Strayed off" has signified his intention of joining Buffalo Bill's party. He has pawned his watch and all his clothing, with the exception of a lacrosse jersey and a pair of trousers, and has given his INDICATOR subscription (with the bill) to the library of the Y. M. C. A.

"They are as sick that surfeit with too much as they that starve with nothing," is one of Shakespeare's wise sayings and will be illustrated by '88 at the end of the present term. The term being very short, some of the professors have given the class about four times as much work as it can do comfortably, so if the class don't know much about what they have been over during the term, don't blame the class.

'88 is entertained every week by one or more nightingales (?) who stand out in the

ing chemistry recitation and lecture
ke the surrounding country very
e indeed, as well as all the inhabitants
including, of course, '88. A very
he music in question goes a very great
the class has already had enough to
til 1900, so the producers need not
hemselves to furnish any more during
ration.

GEORGE CRICKET GROUNDS.

ent requests from the students have
o publish a copy of the agreement be-
evens and the St. George's. It should
it and preserved for future reference.

ANDUM OF AGREEMENT, made this first day
in the year 1866, between
EVENS INSTITUTE ATHLETIC ASSOCIATION,
n, New Jersey, party of the first part, and
GEORGE CRICKET CLUB, of the City of
party of the second part,
SETH, That the party of the first part, in con-
of the covenants hereinafter contained, and
of five hundred (500) dollars, to be paid by
of the second part, as herinafter mentioned,
ollows :

ie party of the second part shall have ex-
: of the grounds, situated at the foot of Ninth
oboken, known as the St. George's Cricket
s follows :

Mondays and Wednesdays of each week from
ereof to May 1, 1887.

Fridays and Saturdays of each week from
ereof to September 1, 1886.

On Tuesdays and Thursdays of each week from
October 15, 1866, it being agreed that the
hall revert to the party of the first part from
October to the 1st of January following.

he exclusive use of the building on the south-
f said grounds, and the right to use all out-
ar the aforesaid southerly building.

ty of the second part covenants to pay for
eges the sum of five hundred (500) dollars, as
Two hundred (200) dollars on the first day of
three hundred (300) dollars on the first day of
1886.

ty of the second part agrees further to keep
aid buildings and grounds in repair; to keep
ice to said grounds unobstructed; to cut the
remove all rubbish which may obstruct the
oot-ball or interfere with any athletic sport.

ALSO AGREED, that the keeper employed by
of the second part shall have the right to ex-
persons from the ground, except the members
ub and their introduced friends.

ITNESS WHEREOF, the parties hereto have
eir respective committees to sign these presents
ay and year first above written.

STEVENS INST. ATHLETIC ASSOCIATION,

By HENRY K. MORRISON, *Pres.*

ST. GEORGE'S CRICKET CLUB,

By A. H. MORAN, *Director.*

ssence of

. BROMLEY.

THE "ECCENTRIC."

The long awaited *Eccentric* is at last before us. As regards the cover, we candidly state that it is not up to our expectations, and yet, had we considered a moment, we would have seen that the choice of cover was the most sensible that the editors could possibly have made. For, the tendency on the part of college annuals for the past few years has been toward great outward adorning and little substance within, following the old adage, "beauty is only skin deep." The choosing of this modest cover is a token of rare forethought on the part of the editors of the *Eccentric*. The heights of gaudiness and attractiveness will presently be reached, and then the former will give way to extreme plainness, which serves only to set in relief the reading matter within. If for no other reason the *Eccentric* should gain friends on account of its modest appearance—but this is only *one* recommendation.

"The Steps," as a frontispiece, is particularly taking, from the fact that this spot is the favorite place of resort for all the students, taking the place of a "class fence." It would appear from a glance at the class history of '89 that this most enterprising class has adopted the plan of giving away a chromo of the historian with every history. '89's anthropological researches are worthy of note. Pausing for a moment to note the events of the year, the wish arises that these records might indeed be "chronical."

But what shall we say concerning "the Alumni and Undergraduate Enterprise?" Only this: that it evinces an interest on the part of the alumni which we had hardly been led to expect—but more of this subject elsewhere. The next cut to attract our continued attention is the "Strain Diagram." It cannot be described; it must be seen. In the same category of things which, in order to be appreciated, must be seen, we mention "Surveyors' Notes" and "The End of the Book." "Don't" should receive the careful attention of all alumni, real and prospective. It gives good counsel to the undecided, and acts as a check upon the boundless spirits of the newly fledged M. E.

In summing up this brief review, we mention the distinguishing features of the book: a very plain cover; unexcelled printing, with slightly too numerous panellings; an unusual amount of literary matter of good quality; paper of fine texture but not quite thick enough. Such is the *Eccentric*, kind reader. We place it commendably in your hands.



At a recent meeting of the Stevens Institute Athletic Association, a committee on the constitution was called upon to report. This committee was appointed at the regular meeting in February for the purpose of collecting the various amendments of the constitution which had been adopted from time to time and inserting them in their proper places; at the same time to copy it so it could be printed if desirable, or at least, to get it in the proper shape for reference.

This committee failed to do anything whatever, claiming that the matter they had to work upon was far too meagre or too badly mixed up and that they were consequently unable to do anything at all.

This report was accepted and the committee discharged and the prospects are that the constitution will remain as it is at present in such form that not even the executive head of the association can flounder through its labyrinth.

Will not some enterprising persons undertake a *difficult* piece of work, of either straightening the constitution as it is now so that it can be followed, or draft something that will put our association on a firmer basis than that on which it now stands.

It seems absolutely absurd to think of appointing any more committees to do the work, for several have undertaken it and all have signally failed.

One radical defect is the method of arranging games with other colleges, etc. All correspondence is supposed to pass through the hands of the Corresponding Secretary, who has absolutely no authority to make any arrangement without first consulting the Captain of the team in question and Board of Directors, which always occasions more or less delay, especially if this Secretary should receive a telegram to fix a date, and the Captain with whom he would have to consult should be a man who lives out of town and cannot possibly be seen until the next day.

Either the Corresponding Secretary's office should be abolished or should be given the authority to arrange all dates.

A great deal more could be said on this subject, but a lack of space prevents.

BASE-BALL.

If there is not more interest taken in base-ball next year than there has been this we would recommend that it be allowed to die, as it is useless to attempt to support a team when the interest of the college is centred on some other sport. The only match games played were with the Brooklyn Polytechnic Institute. Score 4 to 3 in favor of Polytechnics, and University of Pennsylvania—score 12 to 2 in favor of University.

SPRING GAMES.

The Spring games were held on June 1st and were successful in every respect save one which we will leave to the imagination of the readers to find out. The records are given below.

Events.	Winner.	Second.	Time.		Previous best Stevens' Record.	
			Feet.	Inches.	Feet.	Inches.
100 yards dash	Cotiart, '86.	Reid, '88.	5	1 1/2	10 1/2	sec.
220 "	Cotiart, '86.	Uhlenhaut, '88.	9	6 1/2	26 1/2	sec.
440 "	Crisfield, '87.	Cotiart, '86.	19	1 1/2	.....	.....
880 "	McLean, '88.	Post, '86.	310	0	2 min. 29	sec.
One mile walk.	McLean, '88.	Hamilton, '89.	277	9	.....	.....
Running high jump.	Campbell, '87.	Gilchrist, '89.	30	9 1/2	.....	.....
Standing broad jump.	Crisfield, '87.	Broadhead, '89.				
Running broad jump.	Campbell, '87.	Crisfield, '87.				
Throwing lacrosse ball.	Cotiart, '86.	Flack, '87.				
Throwing base-ball.	Harvey, '89.	Finch, '89.				
Putting 16 lb. shot.	Firestone, '87.	Campbell, '87.				

LACROSSE.

In the last lacrosse season closed, great were expected from the Institute team, judging from the fine record they made for themselves in the Oelrich cup ment, but alas! the team was fated to receive the valuable assistance of seven of its best players. Thus weakened, the chances of success were greatly lessened. Twelve were, however, gotten together and had managed to play a very good game when the season closed. The outlook for the coming year is very bright, and if regular training and team practice can be successfully inaugurated there is no reason why Stevens should not take a high stand in the lacrosse world. The record for the season:

Princeton vs. Stevens, at Princeton.....	5-0
Lehigh vs. Stevens, at Bethlehem.....	0-1
Harvard vs. Stevens, Hoboken.....	4-0
N.Y. Lacrosse Club vs. Stevens, at Hoboken.....	6-0
N. Y. University vs. Stevens, at Hoboken.....	3-1

FOOT-BALL.

Accounts of the different games played will be given in the October and November numbers of the INDICATOR. A further discussion of the reasons why they were won or lost is unnecessary. We would only recommend that the foot-ball Captain, for the coming year, pick out the team as early as possible, then select another to play against the regular team. By so doing the team will become somewhat familiar with their positions and will not act like total strangers to the field when they go into the field. Appended are the scores of the different games:

Yale vs. Stevens, at Hoboken.....	55-0
Princeton vs. Stevens, at Hoboken.....	94-0
Princeton vs. Stevens, at Princeton.....	72-0
Lafayette vs. Stevens, at Easton.....	16-12
Graduates vs. Stevens, at Hoboken....	4-0
Univ. of Penn. vs. Stevens, at Hoboken...	22-9
Lafayette vs. Stevens, at Hoboken.....	22-18
Lehigh vs. Stevens, at Hoboken.....	4-20
C. C. N. Y. vs. Stevens, at Hoboken...	0-162
Brooklyn's vs. Stevens, at Brooklyn....	0-14

At the last regular meeting of the INDICATOR the following officers were elected for the coming year:

.....PAGE, '87.	Sec.....FULLER, '88.
.....REID, '88.	Treas.....FINCH, '89.
Members.....MOLLER, '87;	MACK, '89.

COMMENCEMENT WEEK.

PROGRAMME.

Sunday, June 13.—Baccalaureate Sermon. Rev. J. E. RANKINE, D.D., of the Orange Valley Congregational Church, 1st Presbyterian Church, cor. 6th and Hudson Streets, at 4 p. m.

Tuesday, June 15.—Class Supper. Hotel Brunswick, at 11 p. m.

Wednesday, June 16.—Dr. and Mrs. Leeds' Reception to Senior Class.

Thursday, June 17.—Alumni Meeting at 2 p. m. President and Mrs. Morton's Reception at 4 p. m. Commencement Exercises, German Club, cor. 6th and Hudson Streets, at 8 p. m. Senior Promenade at Institute, at 11 p. m.

CLASS SUPPER.

Toast Master.....EDWIN P. MOWTON.

TOASTS.

The Faculty.....	C. RUSSELL COLLINS.
Alma Mater.....	WM. W. RANDOLPH.
Athletics.....	EMILE M. COTIART.
Mechanical Engineer.....	EDWARD J. COOK.
Class '87.....	J. DAY FLACK.
Our Prospects.....	EDWARD T. BIRDSELL.
The College Press.....	WM. FUCHS.
Panoramas.....	JOHN R. SLACK.
The Ladies.....	CORNELIUS J. FIELD.

RECEPTION COMMITTEE.

NORMAN ST. G. CAMPBELL,	J. DAY FLACK,
ROBERT N. BAYLES,	CARTER H. PAGE, JR.,
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PRAYER.

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ARIA.....	"Flying Dutchman".....Wagner.
REVIEW OF THESES.....	PROF. DE VOLSON WOOD.

CONFERRING OF DEGREES AND ANNOUNCEMENT OF PRIZES.

WALTZ.....	"Amorita".....Czibulka.
VALEDICTORY ADDRESS.....	C. RUSSELL COLLINS.
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THESES SUBJECTS.

ANTONIO AGUILERA, JR.

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Manufacture of Yellow Grained Sugar.

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M. G. LILLY.

Same as La Pointe.

J. A. McCULLOCH.

Performance of the "City of Kingston" on her regular trips between New York and Kingston.

J. S. MERKITT.

Cylinder Condensation as determined by Test of a Pump at varying speed.

GEORGE R. METCALFE.

Test of large Worthington pump and boiler at High Service Pumping Station, New York.

F. N. MORTON.

Same as Metcalfe.

E. P. MOWTON.

Design and Construction of 40 ft. Launch.

H. K. MORRISON.

Same as McCulloch.

OTTO PFORDTE.

Mechanical Separation of Ores.

W. C. POST.

Review of Truss over Skating Rink and design to replace it.

L. G. PAINE.

Same as Collins.

W. W. RANDOLPH.

Comparison of the cost of running the cable plants on the elevated road in Hoboken for three different types of engines.

E. D. SELF.

Aluminium and its Alloys. (Experimental Investigation.)

J. R. SLACK.

Discussion of cut-off valves for Corliss Engine.

W. W. THOMAS, JR.

Design of Compound Engine.

E. F. WHITE.

History, Properties and Mode of Manufacture Sulphur.

W. F. WHITE.

Same as Morton and Metcalfe.

J. L. WOODBRIDGE.

Turbines. (Mathematical Investigation.)

An unsettled part of Boston—the dust.—*Ex.*What does a cat go under the barn for? *Nats.—a.*

It cost \$4,200 to present the Greek play in Philadelphia.

Fifty young ladies were recently made bachelors at Boston College.—*Ex.*

The present Harvard crew is declared by experts to be one of the finest college eights ever seen in America.

A poem of one hundred lines has to be written by every Senior of Trinity College, England, before graduation.

President McCosh, of Princeton, is credited with a statement that he has averaged ten hours of work a day during the whole of his professional life.

The graduating class at West Point numbers seventy-eight, which is said to be not only the largest, but the highest in efficiency, ever graduated from that institution.

At a recent meeting of the Intercollegiate Football Association, the following changes in the playing rules were made: The opposing centre rush cannot touch the ball until it has been put in play; a kick-out must be by a drop or a place kick.

The instantaneous photographs, taken at the final show Sherrill of Yale in the lead in the hundred yard dash in the Inter-collegiate games. The referee himself acknowledged that the Yale man won the race, but thought that it had better go to Harvard. This is surely a bad showing for the referee's sense of justice.

The prizes won at the last intercollegiate field meeting were distributed as follows:

	First.	Second.
Harvard.....	5	8
Yale.....	4	4
University of Pennsylvania.....	3	0
Columbia.....	3	0
Amherst.....	0	1

Harvard thus took the cup for the seventh time, and will now hold it permanently.

* THE *

STEVENS' INDICATOR

VOL. 5

NEW YORK 1886

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THE STEVENS INDICATOR.

STEVENS HIGH SCHOOL.

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HOBOKEN, N. J., OCTOBER, 1886.

No. 7.

SONG OF THE MOSQUITO.

I never drink behind the bar,
I seldom quaff Apollinar,
Red blood is good enough for me;
Who cares, for naught alone is free!

Soon as the evening star prevail,
I take and barb my wondrous tail,
And choir away as loud and prim
As any young-eyed cherubim!

I am the Lady of the Lake;
I am a tiger in the brake;
I am a ghoul from Jersey fens;
My point is mightier than the pen's.
—*Philadelphia News.*

THE POLYTHEISM OF THE NORTH AMERICAN INDIAN AND ITS ORIGIN.

It is a prevalent opinion in our civilization, traceable back to some ardent lover of savage life, some hunter, some person whose plain practicality and roughness found no recognition in more cultivated surroundings, that the North American Indian, and, indeed, the savage in general, is more acute in discerning natural phenomena than his more highly-civilized brother; that his simplicity, his disregard of the psychical elements of existence fits him for a more thorough enjoyment of the present life; and that the healthful exercise of the body eventually brings him into a close, though simple, relation to the Deity, that manifest unknown which all peoples reverence. As a matter of fact, however, the comprehension of the savage is comparatively dull; his range of discernment by means of the senses is limited; and, above all, gifted with a vivid, albeit rude imagination, he misinterprets that which he does discern most wofully.

In the first place, his plan of philosophy is in error. He places implicit confidence in the apparent truthfulness of his senses, and whatever is lacking to his sense of completeness is supplied from the fertility of his own brain. In other words, his philosophy is mythologic; it is a series of events explained in analogies from his own experiences. In

accordance with this method he observes that he has volition and the power to execute it; therefore any manifestation of power implies a person exercising volition. In case he can discern no such person he invokes the aid of his imagination. Thus the Deity of the savage is a creation of his own mind, and, since no two minds run in exactly the same channel, the result of this process is the building up of a vast and mysterious pantheon, which bewilders the searcher after truth and leads him to say, "Everything is God!" This is the first and natural stage of theology or philosophy, whichever one may choose to call it.

In this first stage, *hecastotheism*, as J. W. Powell prefers to call it, everything has life, everything is endowed with personality, will and design; animals, trees, rocks, rivers, stars, all things inanimate think and speak, love and hate. The Indian gives to all material objects the attributes which he himself possesses, and thus endowed they ever conduct themselves so as to "point a moral or adorn a tale." The folk-lore of the Indian is almost entirely made up of these solutions of natural phenomena, repeated during the long wintry evening to the eager group about the camp-fire. The aged narrator receives all the veneration and respect due to one of his age and wisdom, and as he thus reads from the unwritten Bible, his stories remind one strangely of the myths of Hindoo philosophy or the less mythical accounts of the Hebrew chroniclers. In the philosophy of the Indian, everything is known; in that of civilization, nothing. For the former it is enough to know that all mysteries are the whims and fancies of the gods—gods whose attributes are human; for the latter to know that any effect has been traced back to its first cause is matter of profound congratulation.

But, if we are desirous of tracing the growth of the pantheistic theory from its first stage, we shall find that in the last analysis it leads the student into monotheism. Let us trace the path of progress. Adopting the names suggested by Powell, we consider the next stage, *zoötheism*, which differs from the first in the exclusion of inanimate objects. Here, however, men and animals are placed on

a footing of equality. Marvellous tales are spun out in regard to the adventures of certain animals, and some peculiarities of these creatures are adduced as lending sufficient authenticity to the account.

The next stage, *physitheism*, is that in which the powers and phenomena of nature, instead of being considered as manifestations of Deity, are themselves personified and deified. This stage appears in great prominence in the Greek and Roman mythology, in which the winds, the rainbow and the dawn were personified. Closely related to this period and shading into it is the fourth stage, that of *psychotheism*, in which mental, moral and social characteristics are represented by deities. These two classes constituted the larger part of the Greek mythology, and also, though to less extent, of that of the Indian.

We have briefly traced the growth of mythological (as distinguished from scientific) philosophy. Let us see what it all leads to. In the first place the tendency is to limit the number of deities. Beginning with the doctrine of pantheism, the lesser gods were successively dropped out until the philosophy reached a point which is best explained by comparing it with the mythology of Greece and Rome. As a result those deities remaining take on new attributes. After a time it becomes necessary that these deities, in form and characteristics like men, should appoint a chief to govern them. Thus there is at least one supreme god presiding over the court of lesser gods. Continuing the sorting process still further, a time will come when the Manitou will preside over empty benches; and when that time shall have arrived, the Indian will have reached the true conception of the monotheistic idea. At present he is busily engaged in dismissing gods by whom his father swore; he is elevating the characters of the remaining gods; he is drifting slowly toward monotheism. It cannot be denied, however, in spite of this progress, that the Indian is much more interesting and instructive in his polytheism than he ever can be in monotheism. CHIC.

♦♦♦♦♦ PERSIAN SPORTS.

At the present time of the year, when all athletics are so thoroughly enjoyed by professionals and amateurs alike, one is likely to inquire whether or not such a multiplicity of delightful and amusing sports has *always* been enjoyed. We will find in the histories of various nations, that each one has sports

peculiar to itself, and without a very *vivid* imagination can almost picture to ourselves Adam and Eve disporting themselves in the entrancing garden of Eden.

Sports, of course, like all other things, advance with the centuries, and where we now have the most ingenious and elegant contrivances for muscular culture, in former days the simplest and most primitive appliances were used, but notwithstanding our advantages, one very rarely if *ever* sees such specimens of magnificent developement as we read of in the early stages of mankind.

Among the earliest nations of which we have any *reliable* records, are the Persians, whom we will find to be rather indolent with regard to field sports, and, in fact, to anything which requires more than *ordinary* exertion. They were a people easily *amused* but positively averse to *amusing*. Their principal amusement was "the hunt," and so we find that the three things taught to the Persian youth were, "to ride, to shoot, and to speak the truth." The writer has before him at the present time, a "cut" taken from a piece of rock sculpture at Takt-i-Bostan, representing a hunting scene, in which the "king" is the central figure; he is surrounded by a host of retainers, both men and women, the men to do the *hunting* and the women to follow in the path of the hunters to make music for the king, who is mounted on a noble steed and attended by a slave holding an umbrella-like shield over him, presumably to protect his majesty from the sun. To aid in the *antelope* hunt falcons and greyhounds are made use of, the former to harass and the latter to chase the prey. Besides the antelope and innumerable other small game, the sportsman will find tigers, leopards, and panthers in the Mazanderan forests.

If one wishes though to recall a thoroughly Persian sport, let him imagine himself to be wandering along one of the isolated Teheran streets—in the distance he is likely to hear a merry jingling of bells, and if he stops to ascertain the cause, he will soon see a typical "sport" wandering along with languid steps, leading after him by a small cord, a *fighting ram*; this man will meet another and after bets, anything from a dinner up, have been made on the powers of the two rams by the owners, the animals are made to fight; a great number of people make their living entirely by these fighting rams.

Although the youths are brought up "to *speak the truth*" they do not seem to think

ting the truth has any connection with y whatever, for while engaged in "fly-pigeons, the one aim is not in the *ex-* of birds but in the *cunning* of the s," who, by various means, try to confuse onents birds so that the two flocks get to such a degree that when they return one or the other of the owners is likely e gained a few, because the poor birds r confusion go to the wrong home. This g of pigeons is considered honorable, order to *regain* the lost birds, the owner pay a great price to the fortunate thief. ther sport is horse racing, carried on ally in the large cities, a race course ; been constructed—that is, the *largest* have been removed—just outside of an ; in these races you will generally at the Shah of Persia has entered about ird of the horses.

withstanding the great interest taken in ree or four kinds of sports just men-, the Persians think more of their *indoor* ments than of their *outdoor* exercises ; quently you will find in every home of onsequence, a gymnasium, where the are taught to leap and wrestle, and in ost other things calculated to strengthen n life, for when they become of age it e *their* turn to be amused by the youths, s *now* their elders time to be amused by

In addition to the gymnasium, the ns employ boy dancers and singers, who not a little to the amusement of the al people. The games of chess, checkers, ammon, cards, and "last but not least," ie played with nuts, which very nearly ponds to our games of marbles, com- the list of Persian sports, in *all* of which o cheats the most is considered not only ghly *honest*, but also the *best player*.

ten all in all, the Persians have *no* games can be compared to ours, and an old sh resident of Persia has laughingly said 'attempting to pen anything about the es of the Shah's subjects would be a good deal like trying to manufacture hing out of nothing." C. E. H.

APPEARANCE IN MACHINERY.

I.—SHAPE.

nachine is a construction consisting of a ination of moving parts with their sup- and connecting frame-work, calculated eive force and motion and apply them

to the production of some desired mechanical effect or work. Since the entire object of a machine is to do work, the consideration of prime importance is that it should be strong enough to do its work well. The next requisite is, that economy of material and fitness of position should be observed in the construction. These two points are generally considered ; when they are not, the machine fails in some way and becomes worthless. But these two requirements should be inseparable, and when regarded as such, the shape of the machine assumes exactly the correct proportions and presents an appearance pleasing to the eye, and we call it beautiful.

Beauty is an assemblage of graces or properties which pleases the sight. The old Roman school used, with great precision, to define beauty as "multitude in unity." All men really desire that a thing should look beautiful, but in their laziness, prejudice, or unwillingness to admit their false ideas, they so twist and distort the notion of beauty, that the result is dire confusion. Now it is not beautiful to have an assemblage of graces indiscriminately placed together ; it is the assemblage that should please the sight. If the work itself is not beautiful, it cannot be made so by heaping on ornaments, and trying to call the eye away from the defects of the machine, to rest upon its decorations. In regard to shape we must consider three points. If, without offending the eye, we can take away anything, add anything or substitute something else in place of some parts, then the machine is not properly shaped. A correct interpretation and a strict obedience of the laws in regard to strength and economy of material and fitness of position will result in a well-shaped machine. This necessitates simplicity of beauty, not extravagance of design. The introduction of superfluous lumps and knobs, far from being ornamental, serves only as a means for catching and retaining dirt, and making it almost impossible to keep a machine clean.

It is the general plan to introduce into machine construction, the principles and embellishments used in architecture. We must draw the line somewhere between architecture and machinery. The principles of architecture, as far as they are the underlying principles of strength and correct disposal of material for supporting weight, should be rigorously adhered to. Buildings and machinery, however, are distinctly separated from each other in further respects. The principles of beauty

call for widely different designs in shape, because the appropriateness differs. A machine is not a mere passive structure like a building; it must do work, and, therefore, must involve different principles.

If we turn to nature, we can, as in every other case, find an embodiment of the very principles which we are investigating. Take for a model, one of nature's machines, that noblest of the lower animals, the horse. The horse moves and does work, machines move and do work; the horse is just strong enough for his work, machines should be the same; the horse possesses perfect beauty and symmetry, so should machines. But in the horse we find all these combined in an essential whole, and in our machinery we should strive to follow the same plan of perfection. If we are to use the force and material furnished by nature, we must also follow the plan of construction and shape supplied to us. Did you ever notice the neck of a fine draught horse? It is a magnificent model; a strong, firm, and graceful taper, starting from the shoulders with the evident of reaching and supporting the head. Not only is his neck strong enough for the intended use, but it looks so. We find no beading, no scroll work about it, and yet the perfect shape is beautiful.

Every support and part of a machine should not only be ample, but must appear ample. All the parts should constructively grow out of its one central body or frame, and so fill out the complete idea of usefulness, strength and beauty. We are fond of confining ourselves to "arcs of circles and straight lines," but we see in nature that where one line or curve is better in a certain place than any other, that will be used and no other will do. Everything is in perfect symmetry, and everywhere is the material used to the greatest possible advantage, showing simplicity, unity, and grace of outline. Then let us do away with cornice-work, beading, and bracketing in our machines. Mouldings must give way and clean, graceful curves take their place, for only such are appropriate.

When we introduce these rules into our art of machine making, and observe purity, propriety, and precision in all parts, then and not until then, will we have machinery whose shape will reflect credit upon us, and the laws of nature, so pure and perfect, will not be so set at defiance.

ALBITAN.

DEFINITIONS.

The word definition may be said to have a double usage. Without attempting to give the exact meaning of the word I will try to indicate briefly its two uses. Of these one may be called its scientific or logical use, the other its vulgar or common use. By the first a word is defined, according to logic, by giving the distinguishing marks of its proximate genus and its specific difference. Of necessity this implies a definition of the next proximate genus, and so on up through the system to broader generalizations, till we reach intuitive ideas which are indefinable.

The indefinability of these ideas, however, does not necessitate indefiniteness, but simply implies that there is no higher genus to which to refer them. If, for instance, we attempt scientifically to define "thing," we will find it rather difficult, if not impossible. "Space" is another intuitive idea. But yet every one knows what a thing is and what space is.

The common or dictionary definition, on the other hand, simply gives another word for the same thing, or describes it by a number of words, the meaning of which, it is presumed, is known to the reader. Such definitions serve their purpose in giving a person an idea of what is meant by the word, but, if examined scientifically, most of them would not stand the test. The importance of perfect definitions in science can scarcely be overrated. I have heard one of the most eminent physicists of this country say that he was almost tempted to believe that the whole end of science was the obtaining of *perfect definitions*. The history of the growth of the science of heat will furnish a very good illustration of this fact. Hypothesis after hypothesis as to what heat is has been set up, only to be demolished to make way for newer and better ones, each succeeding definition being wider in its generalizations and more comprehensive in the deductions to be made from it, till now we have a definition, which seems to be as wide as the universe in its generalizations, and capable of being applied to every individual phenomenon, the modern science of astronomy was founded. When Newton made his great addition to the definition of gravitation, or rather used the definition, as it was then known to him, amplified it, so as to take in the whole universe and every individual particle in it.

The old philosophers, working on the wrong idea of the nature of a vacuum, came to some

absurd conclusions, till Torricelli set them by giving it a true definition, and by defining the force which is developed when a vacuum is made. These illustrations might be multiplied indefinitely, but enough have been adduced to show, in some measure, the necessity of a *perfect definition*.

There are several rules which it is necessary to observe in defining. The first I will mention, is, that the definition must not contain anything undefined. This is radical, and if not observed ruins a definition as such. As an example, one of our professors defined "force" as "number of pounds;" "pounds" as "units of weight," and thus we have "*Force* is a number of units of *force*." One of the students called it as that which causes change of motion, which is much more nearly correct. The definition, which is now pretty generally accepted by philosophers, is, "*Force* is cause of motion." The idea is so nearly intuitional that it is exceedingly hard to define. Another rule in defining is, that the definition must include anything that does not rightfully come under the meaning of the word, nor exclude anything that does. This is the most difficult part of defining, and at the same time the most important. Another of our professors defined matter as anything that affects the senses. As a dictionary definition, this is full of criticism, and probably answers the ends for which it was given, but as a definition it is open to objection on the plea that it is too narrow. I will take the illustration which was given.

We look at a table, we can see it; if we touch it, we can feel it; if we strike it, we can hear it; and there is also an odor emanating from it which we can smell. Now, what we see when we look at a table is reflected light. The diffused light of the sun is reflected from the table, and, entering our eyes, causes the sensation of sight. By this sensation we know the table is there; but that is all. We see certain colors, alternations of light and shadow, and we infer that the object which causes this is a table. Again, when we strike the table, we do not hear the table, but the sound caused by the blow. Again, we do not see the table, but the odor emitted by the table. Another requirement of a definition is that it should not be negative. Telling us that something is not, does not tell us what it is. It is so evident as not to need an illustration. Some ideas can, however, with difficulty, be defined in any other way; as, for instance, the absence of light. It is a question

among philosophers whether such ideas can be defined at all. Darkness is not a real thing, but only the absence of something.

DIER BURNROTH.

NEW DEPARTURE IN CHEMISTRY.

Changes in the curriculum of our college are generally looked at askance, but the one that has been made in the Department of Chemistry at the beginning of the new year is a decided exception. It is a step in the right direction, and one that will not only have the approval of all those interested in the welfare of the Institute, but will give great satisfaction to those whom it more nearly affects.

The change is a two-fold one. In the first place a separate department, to be known as that of Analytical Chemistry, has been formed with Dr. Stillman at its head. By this means the departments of Practical and Theoretical Chemistry are separated, and each, having a head of its own, can be more thoroughly carried on than as heretofore, when both were under the guidance of one man. It allows each professor to give his whole time and undivided attention to his department, and the benefits resulting from such a course must and will speak for themselves.

The second, and by far the more important change, is that of giving the seniors an additional and optional course in laboratory work. After practical engineering, probably the most important factor in the education of a mechanical engineer is a good knowledge of analytical chemistry. It is of use to him in a variety of ways. It will enable him to grasp problems that come up, in the study of the metallurgy of iron more readily, and which he would otherwise have to drop, and it will give him a decided advantage over those ignorant of the methods of chemistry. It will help him to lay a solid foundation upon which to build up a more thorough knowledge of the subject, and should he ever find himself better fitted for other work in later years, he could turn more readily to the new profession.

More than that, engineering has long been considered a practical profession, but it is now very rapidly becoming a truly scientific study. The problems that comes up at the present time in engineering require solutions which go hand in hand with physics and chemistry, and the deeper an insight one has in these sciences the better able will one be to cope with such problems.

Perhaps the best test of the value of the change is the fact that more than one-third of the present senior class have signified their intention of taking the course. That this is no small sacrifice on their part will be better understood when one recollects that the seniors not only have as many afternoons occupied now as the other classes, but that their studies include the most difficult of the whole course—those on heat, and more especially on thermo-dynamics.

It is to be hoped that the change will be made permanent. Those classes which, under the new arrangement in mathematics have surveying in the first year, will have the time now devoted to surveying in senior year to devote to chemistry.

May the good work continue. A. B.

“No. 1, C. & A. R. R.”

At the end of the entrance hall of the National Museum at Washington stands the venerable locomotive “John Bull.” It is very quiet, taking no part in the curiosity and bustle of the sightseers constantly passing and repassing, and hearing the uncomplimentary remarks on its antiquated appearance and peculiar construction with utter indifference. It does not belong to this age, mechanically speaking, and evidently looks upon the men and things of the age as upstarts and unworthy of its notice.

As it stands on the section of the track on which it once ran, who knows but that its thoughts go back to the time that it was such a wonder to all. To the autumn day, fifty-five years ago, when it made its first trip; to the gentlemen of the State Legislature and the throng of people to whom it was the centre of interest; to the two coaches, that it drew with such ease, and the whiskey barrel, with its piece of leather hose for a connecting pipe, which did duty as a tank on that memorable occasion. Who knows but that its rusty old mind is still occupied with these and other reminiscences of youth, and that somewhere in its worn-out frame, from which all trace of fire has long since vanished, a heart, of a primitive and peculiar pattern perhaps, sometimes quickens with mortification at being reduced to the position of a mere curiosity.

Fastened on the forward end of the boiler is a card with the following inscription: “Locomotive ‘John Bull,’ or No. 1, Camden and Railroad. Built in the spring of 1831, by Robert L. Stevens & Son, at Newcastle-on-Tyne,

under orders from Robert L. Stephens, Pres. C. & A. R. R. Shipped to the United States in June, 1831; received at Bordentown, N. J., in August, and run early in September.”

As the people pass, some stop and read, displaying by their remarks such dire ignorance of the railroad architecture of half a century ago, that the old engine shudders, and devoutly wishes it had been left to end its days in the round house on the New Jersey meadows, which sheltered it so long.

For the benefit of those interested a second card, bearing a description of its construction, is hung in a conspicuous place, and reads as follows: “First one used on C. & A. R. R. On November 12th, 1831, in the presence of the State Legislature, with Isaac Dripps, engineer, and Benj. Higgins, fireman, it was run with a train of two cars on a track similar to that on which it now stands, three-quarters of a mile in length, near Bordentown, N. J. In use from 1831 to 1865. Altered and added to in many ways. Original dimensions: Weight, 22,425 lbs.; boiler, 13 ft. long, 3½ ft. diam.; cylinder, 9 x 20 in.; 4 drivers, 4½ ft. diam., with outside cranks for connecting parallel rods; cast iron hubs, locust spokes, tire of wrought iron shrunk on, ¾ in. thick, 5 in tread, flange, 1½ in. deep; 62 flues, 7½ ft. long, 2 in. diam.; furnace, 3 ft. 7 in. square by 3 ft. 2 in. high; steam ports, 1½ by 6½ in.; exhaust ports, 1½ by 6½ in.; throw of eccentric, 3½ in.; grate surface, 10.08 sq. ft.; fire box surface, 36 sq. ft.; flue surface, 213 sq. ft.”

Those who succeed in reading all this announcement probably fare better than the rest of their kind in the estimation of the locomotive, as they, at any rate, show an interest that cannot be mere curiosity; but if it feels any less disdain for these few persons it does not show it. It remains as silent and unmoved as ever, dreaming of other times and other men.

And so the day wears away and evening comes on, and the grey-bearded checker of canes and umbrellas puts on his hat and goes slowly homeward, and the great doors are locked, and the night watchman begins his rounds, and still the old locomotive dreams on.

G. B. M.

A WINTER NIGHT EPISODE.

Night was coming on rapidly, and the up-train on the New York Central had just started from the little station. Slowly the bright patches of light moved up the track,

apparently sliding along the frosty and glistening rails. It was a bitter cold night in mid-winter. The ice had formed a thin crust over the water in the long narrow tanks which, beginning just above the station, stretched away for a thousand feet up the tracks, between the rails.

As the local was rounding the curve half a mile north of the station, the agent closed his telegraph key with a sharp click and joined the shivering group about the red-hot stove, remarking: "The Western Express, due at Poughkeepsie at 6:41, passed there at 7:43. She was due here ten minutes ago. She'll be along here a humming pretty quick." As he uttered these words a prolonged whistle, borne on the north wind, reached their ears. "She's passing Peekskill now," said the agent as he rose and went out. The others quietly drew their wraps about them and followed him out to the platform. A minute later the head-light burst into view around the curve, giving to the ice coated troughs and rails the appearance of a perspective drawing in silver.

Directly below the curve was a down-track signal post operated by a flagman stationed at a second curve, south of the station. The engine had just passed that post when the purple signal light flickered, and changed to green. This the watchers saw; and they knew that in place of the clear white star, which a moment previous had gleamed northward, a blood-red signal sent forth its warning glare. But the engine of the fated train had passed the light five seconds too soon!

What was the danger? None, save the solitary faithful flagman, knew. A sudden hope rises in the breasts of the watching group: Will the engineer slow down and scoop water? The agent alone knows better. No. 39 never takes water between stops, and her famous camel-like quality is hurling her on to destruction at the rate of sixty miles an hour.

Up from the south, between the rails, rushes a lad. Now, as he passes, the agent sees him and cheers him on, at the same time shouting warnings to him. On, on comes the rumbling whizzing line of brilliantly lighted, elegant cars. The youth falls on his knees beside the rail and bends low over it. The engine is almost upon him! Will he never cease his fumbling! Instantly the engine reaches him. There is a flash and a loud report, and a limp and bleeding form sinks into the hollow between the tracks. Then comes a short, sharp blast of the whistle. No. 39 shakes and throbs under a reversed lever. The car wheels are held in

the grasp of an iron hand, and from them the sparks fly as from the revolving stone of a scissors-grinder.

After sliding a short distance the train stops and the train officials and the terrified spectators hasten to the aid of the brave youth. Carefully they carry him into the warm room and examine his wounds. He has fainted from excitement. A deep gash in his forehead and the singed hair and eyebrows betoken the work of a railroad torpedo, and his left hand is bruised by contact with the pilot of the locomotive.

All this occurred eight years ago. To-day if you were to enter the private office of the general superintendent of transportation of a railroad having its centre in Western New York, you would see a young man whose hair, brushed over his forehead, conceals a deep scar, and whose left hand is a trifle misshapen. If you were to become at all intimate with this gentleman, and accept an invitation to visit him at his home, you would see upon the parlor table an ornament in the shape of a section of a rail of silver, upon which rests a signal torpedo of satin and gold. He will tell you that this ornament is the symbol of his success in life. The story he told is fresh in my memory, and it is this.

Eight years ago he was studying mechanics in the evenings, after his machine shop work was done. The night in question he had run down to the flagman's shanty to make some inquiries in regard to certain engines. Walking homeward up the track, he paused to examine a switch recently put on the line for trial. With his limited knowledge of engineering, he detected one or two points where improvements might be made. Stooping closer to examine, he noticed to his surprise that a bolt had in some way become detached from its place, leaving a short rail free to spread when the next train came along. Just then he heard the whistle of No. 39. He ran back to the shanty and fearing he was too late, seized a torpedo and started up the track, with the results above mentioned. The railroad authorities inquired concerning him, and they, with the aid of the passengers he had so daringly rescued from death, enabled him to pass the next four years at one of the finest technical colleges in the country. Upon graduation the New York Central took him into its employ. Now, he is the superintendent of construction of a road under the control of the Central.

Taking the rail tenderly in his hands, he

showed me, as he would show you, the gold plate upon one end, reading :

*Presented to ————— by
the passengers of the Chicago Ex-
press, as a testimonial of their
appreciation of his bravery, in
risking his life to place a torpedo
on the track, that he might save
the lives of others.*

And on the other end, inscribed with sunken gold letters :

January 11th, 1878.

CHIC.

OUR GLEE CLUB.

Whether or not there is in existence a S. I. T. Glee Club would be a subject for some sharp New York detective. There may be found, peradventure, some few traces of its existence and perchance a record of some of its few proceedings during the last collegiate year. But where are the results? Using the favorite formula of one of our professors, we might express it $\Sigma | P = O$, or the summation of ununited effort equals a complete fizzle. The forces were all weak and all pulling against each other. We have had a glee club once and a good one; it seems a pity that it cannot be kept up. There is no other phase of college life that the public at large takes so much interest in as college music and songs. Those of our number who are fond of singing miss very much this only opportunity for the enjoyment of the pleasure in college. The man who has music in him needs practice just as much as his athletic fellow student needs training for our foot-ball and lacrosse. These exercises may make us healthy, strong and manly, but singing, in addition to the benefit derived from the cultivation of the vocal organs, leads us into the art of music, where we feel the influence of the great masters who have gone before us, by coming into a fuller realization of the more delicate shades of feeling and a keener appreciation of all the nobleness and beauty which the art possesses. But more than this, when rightly experienced, it casts an inexpressible influence over our lives and thoughts, toning down the discords and lifting us up out of ourselves, as it were, into some higher realm of nature, nearer to the ^{divine} ~~for~~. Even in the rollicking strains of our songs we experience more fully a college spirit, and seem to find in their an expression for the good fellowship

and fun-loving disposition which so characterize college life. When we take away our glee club we take all this and much more, which nothing can replace.

Our Institute is small compared with many other colleges, still we run foot-ball, lacrosse and base ball teams, have college societies, two annuals and a monthly periodical, and at one time supported a glee club. On account of our small numbers heavy duties often fall to the lot of an individual man, and it becomes necessary that one person has to engage in all of these things. Now to attend to them all properly and not neglect one's studies is sometimes an impossibility. So lack of time has been in some cases a well grounded reason for absence from rehearsals and lack of interest. It seems, nevertheless, that we should be able to find a few interested men who can spare the time to keep up this deserving enterprise. Perhaps, a less number of men would be easier to handle. We lack a leader who is interested; we remember with pleasure and satisfaction the proficiency acquired under the leadership of Mr. Brainard, and especially of Mr. Camp, and there seems to be no good reason why we may not find another leader who will wake us up and thoroughly drill us. More important than all is the well grounded necessity of having the parts properly balanced. Because we have six good heavy second bases it is not necessary that we try to support a club of twenty-four members, but if on the contrary we have only two or three good first tenors, there should only be on the other parts just enough men to balance them. The leader should have the choice of all the members so that no member of the club will feel obliged to vote for this or that man because he is his friend.

There is certainly material enough in our college for a good medium sized glee club, and we hope those who are interested will make strenuous efforts and will receive every encouragement from the college at large, to proceed with preparations for a concert. Our concert year before last was a great success and if some one who plays the banjo will interest himself, organize and drill a good banjo club, we can have a greater success than ever this season. A. A.

The University of Egypt, at Cairo, in 981 had an attendance of over 4,000 students. Ten years ago it had a faculty of 231 professors.

THE NEW THEATRE.

A new theatre recently opened in Hoboken by Mr. Robert Wareing, satisfies a want.

The front is in brick and terra cotta, and is ornamented. On entering the auditorium the incline of the floor strikes us as unusually steep. This arrangement has the advantage of enabling the spectators to see over the heads of their neighbors, and affords them an opportunity to view the stage while performing the gymnastics usually given by one sitting in the rear.

The drop curtain represents an Oriental landscape, handsomely painted in dark and delicate colors. There are four proscenium boxes, the upper one, being divided by a screen of glass interlacing. There is but one balcony, but this extends some distance back, and is therefore very roomy. The ceiling is delicately painted, with a large and beautiful chandelier in the centre. The walls are papered to correspond with the colors of the ceiling. The colors are very well subdued, the whole interior decorating with taste and artistic arrangement. The seats are upholstered with red plush, and are cosy and comfortable. The building is lighted throughout with electricity, and the effect is of good size.

The building is certainly well calculated, by reason of its many excellent appointments, to afford an assemblage of the *élite*. It demands much favor, and will undoubtedly attract much. The music is good, and the plays selected is good. It thus fulfills the requirements of a first-class play-house, and is put before the public as such. When the students are desirous of being entertained for an evening, they can do no better than patronize the new theatre, where they are sure to be entertained, and entertained well.
K. D. T.

Troy Polytechnic contains the follow-

How doth the Freshmen student,
Improve each shining minute;
He goes prowling round the town,
To see what fun there's in it.

Then when exams have come to pass,
On a soiled card he sees his name,
And he wonders how it happened—
He didn't come to do the same.

THE DIRECT PRODUCTION OF STEEL.

The latest proposition in this connection is that of Mr. James J. Shedlock of London. The principals involved in Mr. Shedlock's process consist in the use of reducing gases produced by the decomposition of steam in conjunction with a bath of molten metal, which he employs to take up the metals as they are reduced from their combinations. For demonstration on a practical commercial scale, extensive premises have been taken at Blackwall, and machinery and smelting apparatus put up there for carrying out the process.

Mr. Shedlock's method of treating ores for the separation of their metals, is carried into effect by passing the ore in a finely divided state through a bath of molten metal maintained at a temperature necessary to insure its combination with any free metal contained in the ore. But as most ores contain metals associated or in combination with the metalloids, it is necessary to decompose such compounds in order that the metals may be freed and in such a condition as to readily combine with the metallic bath.

This is accomplished by forcing streams of reducing gases through the bath of molten metal simultaneously with the pulverized ore. For the production of these gases steam is passed through super-heaters, the outlets of which communicate with gas producers, which produce carbonic oxide and hydrogen gases, which are conveyed from the producers by tubes into the bath of molten metal at the point of entry of the powdered ore.

In consequence of the affinity possessed by these gases for the metalloids, and also by reason of their high temperatures, the metallic compounds are decomposed and the volatile constituents of the ores are vaporized, which, with the earthy portions, rise to the surface of the bath of molten metal. The gases and vapors are conveyed through flues into chambers where those that are condensable are thrown down, the permanent gases escaping into the chimney shaft. The metals, as they accumulate in the bath, overflow into receivers through spouts, and as they collect are run into ingot or bars. The ores of iron are stated to be most readily reduced, and its direct conversion at one operation into the different carbides of iron, varying from the softest cast iron to the mildest steel, is easily accomplished.—*Iron*.

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The editors do not hold themselves responsible for opinions expressed in literary articles or communications.

IN consequence of the confusion attending the removal of the effects of the INDICATOR from the Institute, the books were more or less misplaced, and we fear that our exchanges and some of the subscribers have suffered. We will be happy to supply*those with the June issue who have failed to get them. Communications addressed to the exchange Editor will receive immediate attention.

ACCORDING to a prediction in the June number, the INDICATOR was to be taken apart during the summer, and thoroughly cleansed. Such has actually been the case, but the "several modifications of design"

have not yet been perfected. That these modifications of design *will* enable it to work more efficiently when they are carried out, can only be ascertained by experiment. We can, however, assure our readers of a very great change, and that at no distant date, details of which will possibly be made public in the next issue.

AT the last regular meeting of the company, held on May 28th, a resolution was adopted to the effect that two vacancies were to be left in the ranks of the company, providing that such were made by resignation or graduation, to fill which the Freshman class were to elect two of their number before Oct. 15th following. But they have shown no desire whatever to comply with this resolution. What is the matter? Is the class of '90 behind the class of '89 in this respect? Last year there was a great deal of complaint among the Freshmen, because they were not represented on the INDICATOR board, and now that provision has been made for such from the very beginning of the term, they do not take the trouble to chose their representatives. Perhaps they regard the INDICATOR in the same light as the Athletic Association.

IT has been rumored about College that the Freshmen are going to boycott the Athletic Association because they think they have been badly treated by being the first class to incur the trebled initiation fee and the doubled yearly dues. Let the Board of Directors fix a day on or before which the dues and initiations must be paid to even gain admission to the grounds to take part in a practice game. This would undoubtedly bring members to their senses. That the method of changing the initiation fee and yearly dues was irregular, no one will deny; but it was allowed by the presiding officer at the regular meeting of the association, and what can be done about it now?

Some one would examine the Constitution of the Athletic Association they would find no mention about yearly dues. Any student who has been duly elected can, upon the payment of \$1.00 initiation fee, be entitled to all rights and privileges of membership, is the effect of the article relating thereto. There is entirely no provision made for charging dues. What a sad mess this Constitution must be anyhow!

LONG the contributions to this issue was one entitled "What to Say, and How to Say It." The whole line of argument hinged on the fact that no provision is made in the present course for training the students in elocution, and suggested as a remedy that the course of Belles Lettres be extended through the Junior year, and that certain hours should be set aside not only for declaiming and reciting the writings of others, but also for making impromptu speeches on subjects suggested by the professor." It was decided by the Board not to publish this, as sufficient has already been said about this department. We do not, however, consider this proposition at all practicable, partly because there is absolutely no time in the Junior year to be devoted to such, and partly because the students should have had such training before entering the Institute in the preparatory schools, where ample provision could be made, and sufficient time devoted to such as would be of material advantage. The tendency is to raise the requirements of admission, which should tend to increase the average age of the Freshman class. This would keep the prospective Freshman longer in school, where sufficient time could be devoted to declamation to make it of use to him. It is impossible to crowd all the requirements of good academic and scientific education into a four years' college course, especially when the preparation for college has been added to what is actually necessary for the entrance examinations.

COMMUNICATION.

To the Editors of the Indicator :

It seems that Professor Leeds has decided to continue that very excellent method of recitation in chemistry by means of set questions. Although this plan is so popular among the students, and is productive of such good results, yet a great deal of time is lost in recitation hours by the dictation and copying of the questions.

I suggest that the sets of questions for the Junior and Sophomore classes be printed and supplied to each class at the beginning of each year's work; no student could object to being charged a sum sufficient to pay for the cost of printing.

This plan would assuredly meet with the approval of all, and would be eminently successful. "JUNIOR."

PERSONALS.

'75.

THEO. F. KOEZLEY is draughtsman for A. Schweizer, Architectural Iron Works, N. Y. C.

'78.

A. DE BONNEVILLE, formerly in the draughting room of Delamater Iron Works, is now salesman for the works.

'80.

THEO. A. ELLIOTT has established himself as Consulting Engineer, in Buffalo, N. Y.

'84.

G. J. ROBERTS is with the Chicago, Burlington and Quincy R. R., at Aurora, Ill.

'86.

E. T. BIRDSALL is with the Manhattan Elevated R. R., N. Y. City.

E. F. WHITE is Superintendent of the Bergen Point Sulphur Works, at Constables' Hook, N. J.

C. R. COLLINS, United Gas Improvement Co., Philadelphia.

CORNELIUS J. FIELD, with Edison Electric Light Co., N. Y. C.

FRANCIS E. JACKSON, with Edison Lamp Co., Harrison, N. J.

FRED. N. MORTON, with United Gas Improvement Co., Philadelphia.

OTTO F. PORDTE, with Johnson Foundry and Machine Co., Harlem, N. Y.

WILLIAM F. WHITE, with Ames Iron Co., Rochester, N. Y.

ENGINEERING NOTES.

The Brooklyn *Union* states that Chicago is to-day manufacturing more Bessemer steel than any other city in the world. The North Chicago Rolling Mills are turning out 175,000 tons of finished steel rails every year; the Union Steel and Iron Company, 150,000 tons a year, and the Joliet Steel Company, which is virtually of Chicago, 125,000 tons. Chicago is some 450 or 500 miles nearer than Pittsburg to the great Western market, from whence comes an ever increasing demand for the product of furnaces and rolling mills.

Messrs. Oldham & Richards, of Manchester, have patented a new pulley for driving planing machines, which requires no strap fork, and takes the place of the three pulleys, usually required for driving, reversing, and loose turning. This is effected by carrying within the pulley a couple of friction cones actuated by a lever from the machine. The pulley itself constantly runs loose, and as the machine has either to be driven or reversed, one or other of the friction cones is brought into action. By this arrangement the driving strap constantly remains on the one pulley, and a considerable saving of wear and tear is effected, whilst there is no loss of time in stopping the machine for changing the strap from one pulley to another, and the driving gear is brought within smaller compass.—*Van Nostrand's Engineering Magazine*.

According to the *Electrical World*, Professor Elihu Thomson, of the Thomson-Houston Electric Company, has invented a method by which metal wires can be welded together without the application of external heat, but simply by passing strong currents of electricity between the joint of the two pieces to be welded.

The advantage of electrically welding joints is, that the joints are homogeneous and of the same thickness as the rest of the wire. When large conductors are to be soldered, one of the main difficulties has been, that the external heat applied to the joint runs back along the conductor and into the protecting tube. With Professor Thomson's apparatus no such difficulty need be expected, as the heat is localized to the fraction of an inch on either side of the joint. For this reason the invention should also be very valuable in joining the ends of steel band saws.—*Scientific American*.

A NEW PROCESS OF ROUND FORGINGS.—

Mr. George H. Simonds, of Fitchburg, has invented a machine for the purpose of forging iron or steel in any form which can be turned. This involves an entirely new method of working iron. Instead of being hammered or rolled to the desired form, the mass of red hot metal is placed in a groove in two plates which are moved in reverse directions; the grooves are in primitive form at the places where the iron first enters between the plates, and along its course these grooves become more closely in conformity to the shape which is given to the finished piece, which is twisted into shape. The process is applied with success to the manufacture of conical shot, forged out of steel, the British Government having given an order for 500,000 shot, which are being made by the English representative. This process is applied to the manufacture of any small iron or steel pieces of turned form.—*Van Nostrand's Engineering Magazine*.

CALORIFIC POWER OF COAL GAS.—The *Annales de Chimie et de Physique* recently contained a description, by M. Witz, of his experiments for determining the calorific power of coal gas. The method pursued was that of Berthelot, and consisted in the instantaneous combustion of an explosive mixture in a shell plunged in the water of a calorimeter, the elevation of the temperature of which could be exactly measured. A number of trials led to the determination, for a well-purified gas, of a calorific power of 5,200 calories per cubic meter of gas at 0° temperature and 760 millimeters pressure, saturated with aqueous vapor. This result was obtained from a gas mixed with six times its volume of air. Before passing through the scrubber and purifier, the same gas had a calorific value of 5,600 calories, so that it lost something by purifying. If the heat developed by the explosive mixture of one volume of gas and six volumes of air is taken as the standard for comparison, it is found that the same gas gives 5 per cent. more heat when fired with 1.25 volumes of oxygen. With 11 volumes of oxygen, on the contrary, the calorific power is less by 4.6 per cent. It, therefore, decreases with dilution in oxygen. It is not so when gas is mixed with air. When diluted with 11 volumes of air, the calorific value is greater by 2.5 per cent. than when the gas is mixed with only six volumes of air. Thus the effect of the extra dilution is inversely to what might have been expected upon general principles.

kable feat of tracklaying was percently on the New York Elevated perhaps not more remarkable than rs which have not been reported, of note as showing what can be practice and will. Tracklaying on s carried on under difficulties, since at 1½ to 5 minutes' intervals at all ie day and most of the hours of the at 15 minutes' interval throughout naining hours.

to what might be expected, it has l preferable to do all ordinary track-laylight, despite the more frequent obably the very best trackmen on oads would think they could do atever in the way of changing rails enger trains running five minutes on a continuous bridge affording arrowest and most precarious foot-rains are passing ; but this is what

y-five minutes on the morning of th, a gang of eighteen men changed 1,000 feet of track by taking out ld 50-pound rails and putting in as ound rails in their place, completely em and inserting Bush interlocking e joints, all without delaying a train. s an average of forty-three seconds out, and forty-three seconds for rail, including all delays ; but ten taken out and replaced in three and utes, or ten and a half seconds for and as much for replacing ; and ils were taken out, replaced by five and the latter fastened, all in fifty-ls.—*Railroad Gazette*.



pretender is well-known as "Stiggins ;" seer should now be called "Wiggins." religion, the first is a schemer ; to soothsay, the last is a dreamer.

it-fingered persuasion is still among y one could succeed in detecting of its representatives, if there be one, his name would be put down als of the Institute, in boldest type, : benefactor.

It will be well for the members of '90 to familiarize themselves with such expressions as "Yon lathe ;" "Look you ;" "Turn it this road," and a few others of a similar character, as they comprise the peculiar technicalities of the S. I. T. Machine Shop, and a full understanding of them is essential to a successful shop course.

It was highly entertaining to observe the capers of the Freshmen on seeing their names posted as admitted. Many were intoxicated with delight, and went around congratulating Seniors and Juniors indiscriminately. One particularly effusive Freshman slapped a Junior on the back, and exclaimed : "Hooray, old boy ! I'm admitted on trial, too !" The Junior crawled under the library table, and tried to think of the innocence of the Freshman.

Now is the time when the Freshmen should brace up and join the Athletic Association. They all enjoy using the grounds, and it is no more than fair that they should assist in keeping the same in order by joining the Association. The dues are small in comparison with the privileges received, and are within the limits of every one's pocket. The same applies to upper class men as well, only it is directed to the Freshmen, because they are as yet unacquainted with the various institutions of the college.

An '88 man came very near fainting dead away a short time since. It seems that he brought an umbrella one morning, and forgot to take it in the afternoon. It consequently remained in the hat-room over night. The next morning, before coming to the Institute, he remembered his umbrella, and began to consider what color his new one should be. On entering the class-room, however, he was almost horrified to find his umbrella where he had left it. It so unnerved him that he fell down in an epileptic fit, and would have gone in a fainting fit if O. W. J. hadn't been handy with a little stimulant.

It has always been a source of unalloyed pleasure to the students to buy lathe exercises weighing eight or ten pounds, at rates that almost give a man the heart disease, and then to scrape off about four ounces in completing the exercise, leaving the rest of the pieces lying around to be sold over again. Our unalloyed pleasure would be changed to pure delight if they would only get in a few "pointing" exercises. When such an exercise is

mentioned in the schedule, the student is taken to the tool-room, and allowed to point his finger at a casting of the desired shape, for which he is charged two dollars and a half. If every third exercise could be made a "point" exercise, the lathe course would be sufficiently joyful.

Professor W. was discussing couples a few days since. He said a couple was a twist, and very shortly became enthusiastic, and advised the class to "try it on somebody," whereupon the class interpreted him rather too literally, and began to twist each others ears to such an extent that it almost caused a panic.

The roster of the Junior class has been changed somewhat from that of last year. The work is distributed a little more evenly than previously, and gives about the same amount of work to be done each day; which is more desirable than taking but a little one day and a tremendous amount the next. The change of shop-work from Saturday morning to Friday afternoon is a very agreeable one to the whole class. It gives those living out of town the privilege of having Saturday to themselves; whereas, if they are obliged to be in on Saturday morning, what would be left of the day would not be of much service.

The optional course in chemistry for the Seniors has necessitated the discarding of divisions in the Junior class, as the two afternoons thus left open are needed for the Seniors. Outside of a little crowding, however, there is no disadvantage in this arrangement over the old one.

We are indeed much flattered to have the Freshmen send us contributions and take a kindly interest in our welfare. We feel the deepest gratitude for such well-meant endeavors, but we fear there will be a great loss of life in the Freshman class if we receive anything more like the following:

Said S. Chester de Lyon "Oh dear!"
I'm getting quite reckless I fear;
I've revelled as late
As quarter past eight
And drank a whole glass of birch beer.

Said Sheeny Foster vas der costa
To go into dat vorter,
'Twill cost you, sir, to take a bath,
A little silver quarter.
So hellup me! by Gosh, said he,
I really vas too poorer;
I keep my little kvokter, sir,
Und svim me in der sewer.

The annual class elections have taken place, with the following results:

'87.

President, Bayles; Vice-President, McElroy; Secretary, Flack; Treasurer, Moeller; Historian, Page.

'88.

President, Whigham; Vice-President, Taylor; Secretary and Treasurer, Lopez; Historian, Hall; Foot Ball Captain, Uhlenhaut; Chaplain, Rev. A. A. Fuller.

'89.

President, Hoxie; Vice-President, Oliphant; Secretary, Hiller; Treasurer, Peck; Foot Ball Captain, Stevens.

'90.

President, Finch; Vice-President, McCullough; Secretary, Whitlock; Treasurer, Torrance; Foot Ball Captain, Moinan; Base Ball Captain, Marshall.



During the early part of the fall term there is always much speculation about the football team that will be put in the field, and a good deal is always said about the prospects of the present compared with that of the preceeding year. It is to be greatly regretted that a suitable person has not been provided to coach the team, which is generally acknowledged to be the only way of getting a team of any description in working order. The effect of having no such person was very decided in the case of the Glee Club last year, its utter collapse being the result, but this in the case of football is an extravagance not to be dreamt of at Stevens. Last year the team started out with every encouragement, but they soon lost heart, and in ten matches only three were won. The cause of this discouragement was heightened in no small degree by the unfortunate choice of referees and the failure of the captain, on one occasion at least, to remove such—this however has been discussed enough—it ought to be a lesson to prevent hereafter the choice of one who is not known to be acquainted with the rules in vogue at the time. This year's pros-

undoubtedly not as good as last, but plenty of good material at hand if it is sized. The plan of forming a second give the regular College team practice excellent one, only let the principle d out so that each man on the regular be accustomed to his place and know what is expected of him. It has been about college that a series of matches played for a pennant, open to teams various classes, this would certainly an interest in the game, heretofore unby arousing class feeling, which is extinct, a moderate amount of which be far from objectionable. By all et the Board of Directors take the hand without delay, provide a pennant to be won by the lucky team. Competition between the teams of '87 and ises to be sharp enough to be exceeding interesting.

Proposed change in the Constitution of ciation was well put, i.e., "that the Coring Secretary be one of the Board of s," only it should have gone further uded from the Board the captains of football, and lacrosse. Where can association be found that the baseball osse captains have a say in choosing ball team and vice versa? These are field captains, and their authority be limited to such, and not extend to inistration of the affairs of the association. Does an occasion ever come up on Board composed of three, cannot act? be the case, five would hardly be better,

chances are that the whole Board ot be gotten together; the inevitable either case would be the calling of a meeting of the association. That the onding Secretary should be on the s very evident to any one who is accl with the delays that are necessarily ed by some one of the Board having up the Corresponding Secretary, in inform him of the action of the Board, authorize him to make this and that ication.

Reorganization of the Board can be aced in several ways, either limit the o the President Vice President and onding secretary, or abolish the office sponding secretary, letting the duties devolve on the vice president as clerk oard, and include the treasurer; or, if onsidered necessary, let the board be

composed of the president vice president treasurer and two directors, to be elected at large as of old. The change in the amount charged for the initiation fee and yearly dues was undoubtedly the best action that could have been taken. The regular fall election resulted in the following:

Firestone,	'87, President.
Bayles,	'87, Vice President.
Crisfield,	'87, Recording Secretary.
L. W. Anderson,	'88, Cor. Sec'y.
B. P. Hall,	'88, Treasurer.

The captains chosen last year for the coming season, were:

Hart,	'87, Football.
Flack,	'87 Lacrosse.
Drummond,	'88, Baseball.

PRINCETON *vs.* STEVENS.—October 9th, 1886, at Princeton. Princeton Rushers—Spalding, Moore, Cowan, George, Irvine, Cook, Wagenhurst; quarter-back, Sloan; half-backs, Ames and Price; back, Savage (Captain). Stevens' Rushers—Flack, Drummond, Hart (Captain), Ferris, Firestone, Phelps, Coker; quarter-back, Lopez; half-backs, Cuntz and Taylor; back, Uhlenhaut. On account of the excessive heat it was decided to play half hour innings instead of three-quarters.

In the first half Princeton made 9 touchdowns, one of which resulted in a goal, scoring 38 points; Stevens 0. During the second half Princeton scored 20 points more, making a total of

Princeton	58
Stevens	0

During the second half, Flack had his eye injured to such an extent that he had to leave the field; his place was taken by Erben. Hodge, of Princeton, was referee, and was very satisfactory.

PRINCETON *vs.* STEVENS.—October 13th, at Hoboken.

PRINCETON.—Rushers—W. Spalding, Moore, Cowan, George, Irvine, Cooke, Wagenhurst; quarter-back, Sloan; half-backs, Price and Ames; back, Savage (Captain).

STEVENS.—Rushers—Coker, Phelps, Clark, Firestone, Hart (Captain), Moinan, Crisfield; quarter-back, Lopez; half-backs, Campbell and Cuntz; back, Uhlenhaut. Referee, R. P. Bradford, of Princeton.

PRINCETON.....	59
STEVENS.....	0

The general playing of the team was a decided improvement over that of the Saturday before; the quarter-back, however, showed a decided lack of cool-headedness, which is so essential to the position.

The most exciting event of the game was a run by Campbell, who carried the ball within a very few feet of Princeton's goal line; the ball was fumbled, however, when put into play, to such an extent that Princeton got it. As usual there was the same trouble about the referee, who, although it was Stevens' choice, was a Princetown undergraduate.

On Saturday, October 9th, the "Crickets" of Stevens played a game at Prospect Park with the Brooklyn Hills, with the following result:

Crickets	22
Brooklyn Hills	6

The Crickets, last year, were composed entirely of fellows from the Stevens High School. This year they are the same with one exception, some of whom are now in the class of '90.



The *Mechanical Engineer* has many pieces of interest, but we think an article like the "Steam Yacht Races" rather detracts from the standard of the paper.

The *Northwestern* has a well written article headed "Anti-Fraternity." The writer's points are well taken and his arguments valid. It is hoped that it may stimulate fraternity men to root out some existing evils.

The collegiate periodicals are all full of life and interest as they begin a new year. We hope that this energy will not be dissipated but that it may be a stimulus to good work, both in study and sport, to all our fellow students.

Van Nostrand's Engineering Magazine for August, has an interesting article on "Flame Contact," by Thomas Fletcher, F. C. S., which is as sensible as it is ingenious. The October number has a discussion on thermodynamics, by our worthy Professor De Volson Wood, M. A., C. E., which it would be well for all who have some knowledge of the

subject to follow. An address by our late Professor, R. H. Thurston, delivered at the Rose Polytechnic Institute, June 23d, is an able discussion of the "Nation's Great Problem." It appears in *Van Nostrand's* for October.

The *Electrician and Electrical Engineer* for October is full of good reading for all those interested in electricity. We note in particular an article describing a novel arrangement for regulating a number of pendulum clocks placed upon a circuit, by means of a current from a standard timepiece, which current changes the centre of oscillation of the pendulum in the secondary clocks, if they are fast or slow. This rectification is just what any expert would do to a timepiece, but it is performed upon a number of clocks without the necessity of their being opened. It is being introduced by the Synchronous Time Company, of Boston.



Professor: "Some plants grow better by night. Can you name any?"

Student: "Hops."—*Ex.*

Prof. (to Sub. Fresh.): "Can you tell me from what race Napoleon came?"

S. F.: "Of Corsican."

"What is it you like about that girl?" asked one young man of another.

"My arm," was the brief reply.

The highest chimney yet built was completed a short time ago at the Mechernich Lead Works, in Germany. The entire height of the structure is approximately 440 feet, 11 feet of which is under ground.

Professor in Physics: "What would a rope do before it could be drawn perfectly horizontal by means of two forces acting on the two extremities of the rope, at the same level and in opposite directions?"

Bright Junior: "Sag."

An alloy obtained by melting 10 parts of tin with 100 parts of aluminum is said to be more easily fusible and to be less affected by re-agents than pure aluminum. Moreover it can be soldered as easily as brass without any special preparation. Its specific gravity is 2.85.

* UK *

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HOBOKEN, N. J., NOVEMBER, 1886.

No. 8.

THE EYES AS INDICES.

The eyes, like an index, are changeful with thought,
Emotions are shown, and their impulse is caught,
If the owner be willing or no;
They are chestnut, or grey, or hazel, or blue,
Also black, some insist, but that is not true,
Or, at most, accidentally so.

The eyes tinted brown are lively and frank,
They indicate forces of very high rank,
Of emotion, and intellect, too;
They draw from deep fountains of feeling and sense,
In fondness and purpose they're always intense,
They are stable and lovely and true

The eyes colored blue have sweetness and calm,
They drop at your glances, and bear off the palm,
With the mass of infatuate youth.
They are liquid, and clear, with mildness of gaze,
And, if they have anger, they smother the blaze,
And get credit for patience and truth.

The gray are reserved, whatever the thought,
If the will be to hide it, in vain it is sought,
For 'tis hid 'neath inscrutable mask;
Beware of the gray, or take a deep draught,
If you trifle, we warn you, in spite of your craft,
Your adventure will prove a lost task.

ALIIQUIS.

APPEARANCE IN MACHINERY.

II. FINISH.

After we have designed a machine, and have taken care that its shape is everything that can be desired, both for utility and appearance, we must be just as careful in the finish of our work. Being dependent upon where the machine is to stand, and what are to be its surroundings, finish must vary greatly in different machines. Finish is independent of the shape and is added to fill out the beauty to completeness, but we must not by it change the shape or interfere with utility. It is here that bare utility may be adorned and the machine made bright and cheerful looking, and if judgment is used it can be done without spoiling the original shape.

That we may not be too hasty in our conclusions, let us turn again to our model in nature. We have noticed the neck of a fine draught horse and have seen how free from ornamentation is the simple shape. Now, however, in looking at the finish, as we may call it, we see a smooth coat of hair, in some horses it is a bay color, in others black, gray, etc., with a flowing mane falling to one side. But we will observe that the hair is finer and more glossy in some places than in others; in our machinery we may follow this disposal of smooth surfaces and of color. The mane of the horse, however, is to give living expression to the animal, and when we come to such a feature in nature, whose existence is explained by the word, life, we can proceed no further in our adaptation to machinery.

Finish may be given to a machine in two ways: by removing a film from the rough surface, or by adding a film or coating. The one is generally done in the manufacture of the parts, while the other, in the form of paint, lacquer, etc., is put on after the whole is put together. In employing the first process, it is positively wrong to turn useless grooves and ridges on simple parts finished in the lathe. Unless it is necessary to turn off or polish any part, it should stay in the rough; where there is to be no contact, a smooth, painted casting is in better taste than a polished surface, for it shows that there has been no extravagance of labor. The same style of finish should prevail in all parts having the same character, so that if we use rounded corners in one place, such should be the finish throughout.

In painting, there is no reason for confining ourselves to sombre black; it makes our machinery look so dingy and so void of interest, that it is enough to make us feel gloomy ourselves. Occasionally we are startled by a glaring green color or a bright red staring out with ugly inconsistency among our machines. A happy medium would suggest various unobtrusive colors that could be used to advantage; for instance, what could be more handsome than a deep olive, a rich chocolate, or a very dark red? In regard to embellishments

a clear, untarnished background is never improved by covering with an elaborate sprawl of yellow paint or gilt. A machine, with spider webs or chromos painted on it is far from beautiful. A neat and plain device in gold leaf is the purest style that can be used, and it will have a finer effect, and cost but little more than the extravagant display of bright paint. In the finish that we give to our machines, let us have quiet, clean elegance, rather than loud, wasteful display.

When men are to pass the best part of their time among machines, they ought to get both work and pleasure from them. Beautiful things make all who come in contact with them happier and better, so that beauty in the end becomes useful. The order, system, and neatness of symmetrical and beautiful machinery has a good moral effect upon those whose work is connected with it; it will educate them, elevating their tastes and conditions. Men under these circumstances can produce better work; to come down to a practical point of view, this product will command a better price in the market, and the extra outlay that we have made will result in a larger income. These are the only logical conclusions at which we can arrive.

ALBITAN.

MICHAEL FARADAY.

Michael Faraday was born at Newington, Surrey, on the 22d of September, 1791. His father, a very poor blacksmith in feeble health, lived in London not far from the shop of George Riebau, bookbinder and bookseller, and into this shop Michael went at the age of thirteen as errand boy. At the expiration of a year, in consideration of his faithful services, he was made an apprentice, no premium being required by Riebau. During the seven years of his apprenticeship, he read with much pleasure the scientific works that came into his hands, notably "Conversations on Chemistry" by Marcet, and the electrical treatises in the *Encyclopædia Britannica*, performing what experiments he could with his extremely small means. He also made an electric machine, using first a glass bottle, and afterward a cylinder of glass, as well as some other electrical apparatus.

He frequently attended lectures on natural philosophy, in the evenings, and, in order to be able to illustrate his notes, took drawing lessons. Toward the end of his apprentice-

ship, he was enabled, by the kindness of one of his master's customers, to hear four lectures by Sir Humphry Davy. Upon these he took notes which he afterward wrote out as fully as possible, illustrating them with drawings of apparatus, etc. These notes he sent to Sir Humphry Davy, together with a letter asking for some kind of employment in the laboratory. The result of this was that he was invited to call, and was appointed assistant in the laboratory of the Royal Institution. He began his new duties in March, 1813, and in October of the same year went abroad with Davy, acting as his amanuensis and assistant in experiments. Two years later he was appointed assistant in the mineralogical collection, and superintendent of the apparatus at a salary of 30 shillings a week. In the year following he delivered seven lectures before the "City Philosophical Society."

On June 12th, 1821, he was married to a Miss Sarah Bernard and took her to live in the Royal Institution, until 1858, when the queen assigned him a house in Hampton Court.

In 1822, he began investigating the liquefaction of gases. He first succeeded in reducing chlorine to a liquid state by subjecting it to the pressure of its own expansion, when heated in a strong sealed tube. Afterward he succeeded in liquefying several other gases. In 1827 he delivered his first course of lectures before the Royal Institution, and in December of the same year he commenced the first of a series of courses of juvenile lectures, which were given for several succeeding years. In addition to this, he gave Friday evening popular lectures during nearly the whole of his professional life. In 1831 he began his investigations of the induction of the electric current, and the evolution of electricity from magnetism, which resulted in practically making the science of magneto-electricity what it is at present. His first great paper on frictional electricity was sent to the Royal Society in November, 1837. In 1854, he closed his electrical researches which he had continued, together with other investigations for a quarter of a century.

Dr. Bence Jones, Faraday's biographer, says: "The record of this work which he has left in his manuscripts, and republished in his three volumes of "Electrical Researches," will ever remain as his noblest monument; full of genius in the conception; full of finished and most accurate work in the execution; in quantity so vast that it seems impos-

that the man contained 1 pound 12 ounces of phosphorus and 3.5 ounces of sulphur.

After all the above mentioned gases and solids have been obtained, we have left only a few metals with which to finish our man. They are so few and in such small quantities that to form a mining company and try to work them would be hazardous. Iron is found to the amount of 1-10 ounces per man, and is represented in the form of an iron wire. The largest metal constituent is calcium, which forms the basis of lime, and is found to the amount of 3 pounds 13 ounces in the analyzed victim, this being represented by a cube about 3 inches high. The continuation of the analysis will give in conclusion a little block of magnesium weighing 1.8 ounces, a quantity of potassium weighing 2.8 ounces, and then 2.6 ounces of sodium.

The only metal omitted from the collection in the National Museum is *brass*, but this is such a variable quantity even in men weighing 154 pounds, that to give any definite measure or uniform quantity would be impossible. Again, the "breath of life" has been omitted, because of the impracticability of bottling it. So the chemist is forced to satisfy himself with the resulting thirteen elements without any regard for these last two named properties.

C. E. H.

STEVENS' SHARE IN BARTHOLDI DAY.

Cold and damp on the Institute steps at eight A. M. on Bartholdi Day. At that hour the patriotism of the students was indicated by five men; at 8:30 by twenty-five. Then Capt. Hart, with a gradually clearing countenance as the number rose to thirty, formed his men in column of twos and gave the command to march. The somewhat monotonous trip to 42d Street was enlivened by an encounter with "loaded" volunteer firemen on the L-train, and at 9:15 Capt. Hart sent his lieutenant to report to Col. Ketchum—an old college man, a most finished gentleman—marshal of the Educational Division.

"O, the long and dreary waiting! O, the wet and muddy waiting! from quarter past nine until twelve o'clock. During this interval the Columbia boys took up their position at the head of the column with the C. C. N. Y. boys in their rear. Then came Stevens, and after them the N. Y. Dental College men. Each battalion cheered the others, and Stevens cheered one of her boys who sat with a party

of ladies in a balcony on the opposite side of the street. In return he threw us bon-bons. N. Y. D. C. couldn't stand that, so they pelted each other with apples. Suddenly our popular professor of chemistry and his wife appeared. They bowed and smiled at the greeting cheer, and willingly wore the Stevens badges offered them.

So we whiled away the time until noon, when Colonel Ketchum ordered a march. All the college boys seemed to take pride in marching well, and, without any preliminary drilling, succeeded remarkably well. Even the most awkward man presented quite a soldierly appearance by the time the grand stand was reached. But how the ladies stimulated us to cheer by their waving handkerchiefs, and how the President smiled when we cheered him, and how the French visitors wondered to hear us utter our peculiar yells are matters of interest to us only.

Down Fifth avenue, down Broadway to the City Hall, through Park Row and on down to Wall Street we marched. At Wall and William Streets we were dismissed. Then was the opportunity of the favored few. The five delegates from Stevens together with the four from C. C. N. Y., set out for the Barge Office armed with a telegram from Gen. Stone. The purport of the telegram was that "a small deputation would be allowed to go on Liberty Island." At this stage a funny incident occurred. Capt. Hart had received the telegram the day before, and, expecting to receive passes, had deemed it of no value; so he has used the back of it for notes on Thermodynamics. When the policeman took this telegram to Gen. Stone he delivered it wrong side up, much to the perplexity of the general, who could neither understand the confused mass of mathematics nor see its application to this particular occasion. When, however, one of our men was admitted and explained matters, an aid was instantly sent out to the lines to admit us. As we filed in past the general and his staff the former roused all our latent pride and self-consciousness by raising his chapeau and saying: "I am glad to meet you, gentlemen; it pleased me greatly to see you in the parade to-day."

Then came the tug-of-war. Nothing to eat since six o'clock, and before our famished eyes the entire engineer corps eating their two o'clock lunch. The nine of us, huddled together in a corner, watched the officers carelessly munching sandwiches, and from the same corner arose a general groan whenever

a crust fell upon the floor. But otherwise it seemed we were under Gen. Stone's especial care. When it came time to embark a captain of artillery called out to the hundred or more invited guests that only Gen. Stone and his staff were to go on board at first, but no sooner had the general reached the deck than he called out that his staff "and the delegation from Stevens' Institute of Hoboken" would go on board. So on board we went, in advance of those bearing special invitations. The incidents on board can be briefly summed up by saying we had all the whistling, all the cannonading, and all the sociability that we desired; and when we thanked the general for the remarkable favor he had shown us, he answered that he was "pleased to be of service to us, and our college cheers had taken him back to his own college days, which with these gray hairs were something to look back to."

To those who enjoyed the general's kindness this day will be ever memorable. Had it not been for him we would have missed the best part of the day's ceremonies. We cannot speak highly enough of him or his staff, or Col. Ketchum, either as soldiers or as gentlemen.

CHIC.

THE STONE SAWS IN USE AT NORTH BELLEVILLE, N. J.

There are two works located at North Belleville, *using different methods* for sawing stone, and at each place the foreman claims that his machine gives more satisfactory results than his neighbor's.

On the west side of the river the red sandstone is sawed with diamonds; four of the precious stones are set in a small steel plate which is fastened to the lower edge of an iron blade, 18 ft. long, 10 in. deep and $\frac{1}{4}$ in. thick. The blade is attached to the bottom of a stout wooden frame and carries sixteen sets of diamonds, spaced a foot apart.

The frame received a horizontal reciprocating motion from a crank of 21 in. throw, driven by a 30 horse power engine. Four vertical screws, two at each end of the frame, are connected by means of bevel gear with a *click and ratchet*. The click is moved by an adjustable lever connected with an eccentric on the engine shaft. The lever is adjusted to feed 16 inches an hour when the diamonds in the saw are new and sharp, but after five or six weeks only a 7 in. feed is used.

The complete set of 64 diamonds lasts about ten months and costs \$200.

The stone to be cut is placed on a hand car, and run under the saw on a track. Blocks 12 ft. long and 6 ft. high can be cut here.

This saw has been running thirteen years, and besides the slow feed, it has a belt connection which raises or lowers it rapidly when a new cut is to be made. An abundance of water is run continually into the cut, and the work is left with a fine finish which needs no dressing.

On the east bank of the Passaic there are two saws which have wrought iron blades like the other, but are fed with a mixture of sand, water, and small shot made of chilled iron. The shot do the cutting and are used several times over; they cost \$15 a cwt., and are used, I am told, in many stone sawing yards.

These saws are run by a crank and connecting rod, but instead of moving on horizontal guides they are hung from a cross-head at each end by six foot rods. The cross-heads run in vertical guides, and are both lowered together by unwinding two steel ropes, wound in opposite directions around a drum. The drum is driven by a chain belt which receives its motion from a shaft driven by a worm gear, which in turn receives its motion by means of bevel gear, from a belt driving a cone pulley.

These saws cut 14 inches an hour with new shot, and 8 inches with shot which have become worn; the blades are $\frac{3}{8}$ in. thick, 8 in. deep and 12 ft. long, they seldom last longer than ten days, although one had a life of seventeen days.

One saw has 16 inches travel and makes eight throws, while the other with a 12 in. travel makes ten; while the slower moving one can never be fed more than 8 inches an hour, the swift one cuts 14 inches an hour with new shot.

A 45 horse power engine runs both saws and each is capable of cutting a block 12 ft. long by 10 ft. high. When either of these saws is to be reset it is raised by a crank turned by hand. The surface of stone cut by this method is not smoothly finished, being scored at the ends by curved lines a sixteenth of an inch deep, while in the middle the lines are nearly straight and not quite so deep; thus the work always requires dressing by hand.

Pr.

THE ARTESIAN WELL PHENOMENA.

Belle Plaine, Iowa, has a sensation scarcely less surprising than the earthquake at Charleston. It is worthy the attention of educators that so many startling phenomena have occurred about the same time. The seismic movement in South Carolina and on the Eastern hemisphere; the renewed activity in the Yellowstone Park, and this Iowa artesian overflow. In early spring it was discovered that flowing wells could be secured in Belle Plaine, and six were driven to a depth of from 210 to 301 feet, wholly in drift, and without reaching its bottom in any instance. Five flowed, and in the sixth it came to within three feet of the surface. The seventh well was started about fifteen feet below the next lowest. A two inch well was sunk. It went through four feet of soil, ten feet of yellow clay, sixteen feet of fine sand, eighteen feet of gravel and 145 feet of blue, stony clay. The flow was struck in a lower fathomless strata of sand and gravel. Pieces of wood and other substances were brought up by the flow from this depth, indicating the presence of one of the "old forest" beds.

The flow struck did not differ materially from the others. While trying to force a three inch pipe, the water broke outside of it, rapidly enlarging the well until a vast volume of water poured forth, inundating the streets and adjoining lots, bearing with it much sand and some pebbles, with a great variety of northern rocks. The volume was more surprising than the height, as it did not rise more than five feet. Its diameter was about three feet; it flowed nearly five million gallons per day, by estimate.

The other wells gradually declined, ceasing to flow after a few days. The head lowered about five inches a day. It is estimated that the source is an underground reservoir of from forty to four hundred acres. There is every reason to believe that it has no connection with the seismic movement.—*Science Monthly*.

ENGINEERING NOTES.

A Russian commission appointed to test rails and tires found: 1. Tires from soft steel are more brittle, liable to break, than hard steel ones. 2. Tires from soft steel wear much more rapidly than hard ones, and are not to

be recommended. 3. Very hard steel is bad in use and requires frequent turning up. 4. The best tires contained more carbon and much less manganese than the less excellent, 0.5 per cent. against 0.37 per cent. for carbon, and 0.37 per cent. against 0.76 per cent. for manganese. The proportion of silicon to phosphorous is pretty constant in the best tires. The commission recommended changes in the imperial regulations for rail testing, looking to the retention of the bending and drop tests, the former only within the elastic limit, the latter to be tried both with chilled—reduced to freezing temperature—rails and warm ones, with a reduction of the height of fall and omission of a second drop. Each charge to be tested for the above by taking one rail out and testing it in three pieces separately. In addition, tensile and chemical tests are to be made periodically during delivery, for which limiting figures are set for strength and amount of injurious elements, silicon, manganese and sulphur. For tires the drop test is to be reduced and the tensile test retained.—*Van Nostrand's Engineering Magazine*.

A useful alloy of aluminum and tin has been obtained by M. Bourbouse, by melting together 100 parts of the former metal with 10 parts of the latter. This alloy is whiter than aluminum, and has a density of 2.85, a little greater than that of the pure metal (which is 2.56), so that it is not too heavy to replace aluminum in instruments requiring great lightness of their parts. It is less affected by reagents, etc., than aluminum, and also is more easily worked. Another of its merits is that it can be soldered as easily as brass without any special preparation.—*Scientific American*.

The *Electrical Review* states that, Hartman & Braun, of Frankfort, have put upon the market a very compact and complete Rheostat, the invention of Prof. Kohlrausch. This instrument furnishes a direct reading of the resistances of conductors, and is, consequently of great value in laboratory experiments, but especially so in practical applications. The apparatus comprises a Wheatstone bridge made with a silver wire 25 "centimeters" (10 inches) long and wound in comparative resistances of 1, 10, 100 and 1,000 ohms, and is enclosed in a box.

The contact sliding back and forward on a metallic strip serves as indicator for the different resistances of the bridge, which is so arranged as to allow of a direct reading without calculation of the resistance to be determined. The instrument is made complete by an induction coil which serves as an excitant of alternating currents to prevent polarization when the resistance of currents is to be measured.

The *Scientific American* estimates the relative value of natural gas and coal in this way. Of Pittsburgh coal 55.4 pounds contain the same number of heat units as 1,000 cubic feet of natural gas. With coal at \$1.20 per ton, 1,000 feet of natural gas would then be worth $3\frac{1}{2}$ cents. But by tests made by the Westinghouse Air Brake Company, 1.18 cubic feet of natural gas evaporated one pound of water from 190° F., with the same boiler under which one pound of the best coal evaporated 10.38 pounds of water. That is, one pound of coal equals 12.25 cubic feet of gas, or 1,000 feet gas equal $81\frac{1}{2}$ pounds coal. This difference results from the expenditure of heat necessary to raise solid fuel to the gaseous state, which must be done before combustion can take place. In a house grate the loss on this score from using coal would be more than in a large furnace of a factory. Hence, the greater economy in the use of natural gas is in houses and small establishments.

A method of sending a picture by telegraph has been invented by a Scotchman, W. Gemmill, by which a photograph taken at one end of a wire is transmitted and reproduced at the other. The picture is primarily projected on a selenium cell placed in the telegraphic circuit, which, according to the degree of intensity of the light received, acts upon the current, and through it a number of subsidiary currents connected with an incandescent lamp, illuminating it with varied degrees of intensity consonant with the strength of the current. "These successive illuminations," according to the *Photographic Times*, "would give images of corresponding brightness to the points in the picture thrown upon the selenium cell, and the final picture, of course, would consist of a series of these points in various depths of shade."

Effect of overblowing steel upon the elimination of phosphorus. A. Tatum describes, in the *Zernkontorets Annaler*, a somewhat curious experiment made at the Vestanfoers Bessemer Works. A charge of 1,850 kilogrammes of pig iron was blown until it was reduced to only 400 killogrammes. The following analyses show the composition of pig : (A); the composition of the steel when the flame becomes short. (B); its constituents, an hour later (C); and the final product (D) :

	A. Pig.	B. Flame Short.	C. One Hour Later.	D. Final Product.
Carbon.....	4.05	0.03	0.025	0.02
Silicon.....	1.125	0.025	0.040	0.014
Phosphorus....	0.024	0.029	0.046	0.066
Sulphur .....	....	Trace	....	....
Manganese	4.50	0.10	0.03	0.03

This proves that, even if overblowing is carried to an extreme, on an acid bottom, the phosphorous is not eliminated. The increase, of course, is due to concentration in a smaller quantity of metal.—*Van Nostrand's Engineering Magazine*.

It is estimated that not less than 14,000 horse-power, derived from river falls, is to-day in use in the United States and Canada for electrical purposes—mostly for electric lights.—*Electrical Review*.

The cross sights of surveyors instruments are now largely made of platinum wire. The wire used for the purpose is drawn to a diameter of about one twelve-thousandths of an inch. To accomplish this fine drawing platinum wire three one-thousandths of an inch is covered with silver bringing the diameter to one-tenth of an inch. This is then drawn so as to give the diameter of platinum core required, then the silver is eaten off with acid leaving the platinum wire.—*American Machinist*.

The *Eighty-Four* for July has just appeared upon the scene, with a characteristic lateness which we fear belongs to the majority of "Stevens" publications. As it is only for the reading of the Class of '84, we will refrain from criticism.

The Stevens Indicator.

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The writer's full name, as well as his NOM DE PLUME, must accompany the article, as assurance of good faith and reliability; but it will not be published, unless desired.

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Letters for publication should be written legibly in ink, upon one side of the paper; unless too long, they will be inserted as written.

The editors do not hold themselves responsible for opinions expressed in literary articles or communications.

AGAIN the INDICATOR appears behind time. This is almost entirely owing to the relaxation preceeding the dissolution of so powerful a monopoly as the INDICATOR Publishing Company. However, our readers, we feel sure, will pardon this when they consider the sacrifice we are going to make for their good. But we will endeavor to brace up for our next and final issue.

WE heartily agree with Mr. A. B. on several points set forth in his communication, *i. e.*, the want of a catalogue, the lack of sufficient chairs, and the total absence of a suitable reading-room, but when it comes

to forming a "Library Committee" from the classes, we think he has gone a little too far. Such a proposition is as impracticable as it is impossible, and we doubt very much that Mr. A. B. himself would be willing to serve on the proposed Committee.

AT a meeting of a special board appointed by the Executive Committee of the Alumni Association of Stevens Institute of Technology, and of a Committee of the INDICATOR Publishing Company, held in June, 1886, with a view of establishing a basis on which united action of the Alumni Association and the undergraduates could be secured in the interests of the paper, the following agreements were entered into:

First.—Dissolution of the present stock company controlling the INDICATOR, and the appointment of a board of editors consisting of two alumni and four undergraduates, one from each class.

Second.—In case of discussion as to the propriety of matter for publication, a majority vote is to effect a final decision, the provision, however, being made that the alumni editors should decide as to the fitness for publication of material coming through the other members of the board.

Third.—The under-graduate members of the board are to be selected every year by the under-graduate members of the retiring board, from two men nominated by each class.

Fourth.—The business management of the paper is to remain in the hands of the undergraduates.

Fifth.—Publication is to be made quarterly instead of monthly, as heretofore; the paper is to be increased in size, and its standard throughout as a college magazine elevated.

This change can hardly be anything but beneficial. We can count on the articles from the alumni editors as being creditable, not only to the organization from whom they were chosen, but also to the profession in general. The two gentlemen who have been selected are men of reputation, whose writings

as standard authorities on many. They have not signified their will—accept the positions tendered—we earnestly hope that they will, year at any rate, as they will unplace the INDICATOR in the first the outset.

As the undergraduate editors, it is not that they can produce more matter for a quarterly than a

month of the greater amount of time to devote to such work, they will be enabled to produce the result of their labors of infinite interest to themselves and of considerable interest to others.

There can be little doubt of its success from a financial standpoint, judging from past

experience. It cost about 16 per cent. of the Alumni Association to publish the INDICATOR, but under the new management every member of the Alumni Association will be a subscriber, the annual subscription has been raised the necessary amount, and the amount to quite a large sum. Heretofore subscriptions have amounted to about 10 per cent. of total cost of publication.

Under the new management the cost of publication will assuredly be less than heretofore. The subscriptions will then amount to 70 per cent. of the actual cost of publication, so that with a business manager, who will exert himself as he should, there will be quite a surplus even under ordinary conditions.

COMMUNICATION.

LIBRARY—ITS USES AND ABUSES.

Editors of the Indicator :

As our college has the reputation of being the first of its kind in the country, it is in a very unenviable position of having no practical value to the students. In a very short statement, the uses of the library are *nil*. Let us see how true this

statement is. We have a large room—yes; quite a number of tables—yes; five chairs—yes; 1,000 (?) books—yes; and that is all. Suppose any one of us should wish to look up a certain reference. Now, if all the other conveniences were at hand, we should have to go through the following routine. As there is no catalogue, go to each case and read the title of every work until the desired one is found. This takes up from one-half to two-thirds of the time, if you have good eyes and read quickly. Then hunt up O. W. J. and get him to go to the library and open the case—after signing a card you have at last the desired treasure. Then, after settling down and finding the proper place in the book, you take out your watch and find that there is just enough time left to be off, either to a recitation or elsewhere.

Again, suppose, now, that you did have another hour or so to spare after obtaining the book, where will you go. There is a standing rule in the library that no books must be taken from the building. There are then one of two places to choose from. Either go to the classroom or stay in the library. But, you can do neither. The classroom is out of the question entirely. No one can study there. The library is a general lounging room for all classes; it is a general passage-way to all the rooms in the building for all who come in the side-door; and finally it is the college post-office and advertising stand. Putting all these things together, one can obtain an idea of the chances there are for study or even reading.

And yet in physics, in engineering, in mathematics we are continually being referred to books, which we do not possess and which we cannot afford to buy; and all these books are in the library, and we, because of the existing state of affairs in the library, are unable to derive any benefit from attending the lectures in the various departments.

These things ought to be remedied, and the writer desires to propose the following scheme. He hopes that, in the interest of all the students, it will be thoroughly discussed and some action taken upon it by the authorities.

In the first place, that the library may not only be one in name, but in reality; it must be made quiet. This can only be done by closing up the entrance that leads into it from the side door, and also closing the small entrance into the wash-room. By closing up the side entrance no one is inconvenienced. All the class-rooms are on the upper floors, and the students can just as well go right up into

their respective class-rooms as turn into the library.

Having now obtained a quiet room, the next thing is to put the management of the library into the hands of some who have requisite time at their disposal. To this end let there be chosen from each class in the Institute two members, who are to form the "Library Committee." These men are to be elected by the class from a certain number selected by the Professor of literature. The duties of this committee shall be to keep all books tabulated; to see that the library is only used as a reference library; that no books are removed; that whenever a book is desired, they can give information as to whether it is in the library, and to tell where it is; they shall be responsible for all books, etc., etc.

By this means, no extra expenses will be incurred by the Institute; so that there can be no objection from that side. The interest of the students will certainly be awakened, and having a place where they can read and study, the library will certainly be made use of as it ought to be, and the results thereby attained will certainly add to the high name of our Institute.

A. B.



Considering the day, the boys turned out pretty well on Bartholdi Day.

What has become of that "cane rush" that was to take place between '89 and '90?

Going! Going! Gone! What! Why, the cross-section paper. Let us sing the fortieth hymn.

At a meeting of the non-fraternity men held Wednesday, November 3d, Fred N. Connet was elected neutral editor on the *Bolt* for 1887.

The name of Ladd Plumley, formerly a member of the class of '87 S. I. T., appears in the college roll in the catalogue of Lehigh University, Bethlehem, Penn.

On Wednesday evening, October 20th, Dr. and Mrs. Leeds held a reception for the Senior

Class. The Class was fairly well represented, and passed a very pleasant evening.

At the regular meeting in October, Pierson, '88, and Schenck, '88, were elected members of the I. P. Co. At the same time Schenck was elected to fill the vacancy in the board of editors.

Prof. Kroeh deserves many thanks for the kindly interest which he exhibited in making the arrangements for Bartholdi Day, by which the students were offered a position in the parade.

Prof. of Engineering, lecturing on fire extinguishing apparatus, and a little mixed:

"Well, they found they could not throw the fire into that flat, so they put out the water with pails."

At a special meeting of the company, November 15, Fuller, '88, was elected Business Manager, Finch, '90, having resigned. At the same time Pierson was elected to fill the vacancy in the board of editors.

We have recently heard of a photographer who, having occasion to use some cyanide of potassium, bit a piece in half to make it smaller; but we did not hear whether his funeral cost any more on that account or not.

Prof. W—— recently remarked that, under certain conditions, a specified problem would not be "soluble." This shows a new application of the word *soluble*. We have heard it applied to material substances before, but never to anything as abstract as a problem. "Live and learn."

The latest discussion in "Dutch" is the difference between a "Krupp" cannon and a red nose. Also the question as to which burns the longer, a wax candle or a tallow candle. Our liberal translator says he don't see the joke to the former; but he says that in the latter case neither candle burns longer. They both burn shorter. He! he!

This must be the season when "the soul of man is stirred within him," for one man begins an engineering essay as follows: "Since first the human race directed its tottering infant steps into the path that leads up to civilization, men have been attempting, not without success, to impose the drudgery of their tasks upon dumb beasts and uncomplaining machinery."

Tuesday evening, November 9, Dr. and Mrs. Beyer held a reception for the Junior League. The weather favored the occasion, and the party was well represented, considering the cold weather who reside out of town. Some of the guests were present, and the members of the League had the pleasure of meeting them.

The evening was much enjoyed by all present, and thanks to the host and hostess.

The nervous system of '88 has had a very good shock. It was discovered on the night of the Junior League's reception that Beyer had with those beautiful whiskers of his, not been for the fact that an unalloyed state of mind existed on that point, a very serious panic might have ensued from such a dreadfully exciting cause as its appearance without any warning. Be careful about those things in the future. Do such things gradually, or else they will get hurt yet.

The regulation rush has taken place between '89 and '90. The former met the latter in the hall adjoining the mathematics room. It exerted an outward pressure on '90, and made them terrified and exerted a back pressure on '89. But in this case the summation of forces was not equal to zero, a fact which resulted in '89's acquiring an accelerated motion in the direction of the greater force. It seemed to be coming from a recitation hall at the time, and was thus made an untimely witness of the affair, which made the class to be the recipient, the next day, of a lecture for rushing '89.



During this season the team has done very well, having met Yale once, Princeton once, and Harvard once, it being noticeable in these games that the scores, in comparison with other matches, were very creditable. There seems to be something very wrong with the centre of our rush. The men do not "block" long enough. The quarter-back is not able to put the ball into the hands of the half-backs. Also, when the

half-backs run with the ball, they do not run towards the side of the field which is clear, but try to get through the line immediately in front of them, where they have a very small chance of getting through. Now, let the centre "brace up" and block hard, so as to give the quarter-back time to pass the ball and to pass it well. Our half-backs are both good runners, and, I think, if given a chance, that they will improve it, and that we will be able to make good record before the season is over.

HARVARD VS. STEVENS.

The following team went to Cambridge to play the annual football match with Harvard on Saturday, Oct. 16, 1886.

STEVENS.—Rushers, Flack, Phelps, Weichet, Firestone; center, Hart; (Captain) Emmet, Hawkins; quarter-back, Lopez; half-backs, Cuntz and Uhlenhaut; full-back, Taylor.

HARVARD.—Rushers, Harding, Remington, Woodman, Brooks; (Center and Captain), Burgess, Butler and Holden; quarter-back, Dudley; half-backs, Porter and Seais; full-back, Peabody. Referee, Mr. Fiske, '86, Harvard. Time of game, one hour and thirty minutes.

During the first half our team played a very good game keeping the score down to 10 points, one touch-down and goal, and one touch-down and no goal being made by Harvard to Stevens' 0.

With the wind in their favor in the second half Harvard secured 34 points, Stevens not scoring, making the total score, Harvard 44, Stevens 0.

YALE VS. STEVENS.—Wednesday, October 20, 1886, at St. George Cricket Grounds, Hoboken, N. J.,

YALE.—Rushers, Robinson, Gill, Burke, Corbin, Woodruff, Carter, Wallace; quarter-back, Beecher; half-backs, Watkinson and Wurtemberg; full-back, Pratt.

STEVENS.—Rushers, Reid, Emmet, Drummond, Hall, Firestone, Taylor and Torrance; quarter-back, De Hart; half-backs, Campbell and Cuntz; full-back, Uhlenhaut.

Referee, Mr. Bradford, '87, Princeton. Capt. Hart was unable to play from injuries received at Harvard, and Campbell acted as captain. Our team made a very creditable showing as it was little better than a "scrub," Hart, Phelps, Crisfield, Hawkins and Lopez not being able to play. The playing of Yale was excellent. The ball was kicked off by

Yale at 3.15 p. m., and Wurtemberg made a touchdown in three minutes, Watkinson kicking a goal six points, a goal from field by Watkinson, five points and a touchdown by Watkinson, resulting in no goal, four points, followed by a touchdown by Wurtemberg; goal by Watkinson; six points and a touchdown by Carter; no goal, four points, a touchdown by Wallace; goal by Watkinson. Six points ended the first half, Yale scoring 31 points to Stevens' 0. During the second half Stevens played in better form. Gill made the first touchdown for Yale; goal by Watkinson, six points; followed by touchdown by Wallace, four points, punted out to Beecher. Watkinson tried for goal, but missed. A safety by Campbell, two points; a goal from field by Watkinson, five points; followed by touchdown by Wallace; goal by Watkinson, six points. Time called here. Yale, 23; Stevens, 0. Total score: Yale, 54 points, to Stevens 0. Time of game, one hour.

LAFAYETTE vs. STEVENS.—Saturday, Oct. 23, 1886, at St. George Cricket Grounds, Hoboken, N. J..

LAFAYETTE.—Rushers, Gutelius (Captain), Overton, Harvey, Williams, Rohrback, Cummings and Brady; quarter-back, Krick; half-backs, Camp and Paine; full-back, Mellwaine.

STEVENS.—Rushers, Crisfield, Drummond, Hart (Captain), Clark, Firestone, Phelps and Reid; quarter-back, Lopez; half-backs, Campbell and Cuntz; full-back, Uhlenhaut.

Referee, Emil Schultz, Yale. Ball was kicked off by Stevens at 3 p. m. From the first it was evident that the game would be close, as the teams played evenly.

During the first half, a goal from field by Camp gave Lafayette five points, Stevens not scoring. During the second half Stevens played much better. In the last part of the second half Campbell made a free catch and tried to kick a goal from the free kick, but missed, the ball going over the Lafayette goal line. Reid secured it and made a touchdown for Stevens. Gutelius, Captain of Lafayette, put in a claim of no touchdown, claiming that Reid was "off side," which was given by the referee before Captain Hart had anything to say about the decision. The decision being protested by Stevens, the referee saw that Reid could not possibly be off side, and promptly reversed his decision, giving Stevens the touchdown, from which Campbell easily kicked a goal. After a few minutes more play time was called, the score being 6 to 5 in favor of Stevens.

LEHIGH vs. STEVENS.—At Hoboken, Oct. 30, 1886.

LEHIGH.—Polk, Palmer, La Doo, David Netzel, Lee and Cartin; quarter-back, Ely; half-backs, Lewis and Phelps; full-back, Bradford, (Captain).

STEVENS.—Rushers, Reid, Phelps, Drummond, Clark, Firestone, Hart (Captain), and Crisfield; quarter-back, Lopez; half-back, Campbell and Cuntz; full-back, Uhlenhaut.

Referee, Mr. V. Aldridge. Ball was kicked off by Stevens at 3.10 p. m., and was at once rushed down near Lehigh's goal, where it remained nearly all the time. Campbell made a try for goal, but missed. Time was called neither team scoring. In the first half, Clark had his ankle injured, and Taylor took his place. During the second half, Lehigh had two trials at goal, but missed them both. The play was very even, both teams being well matched, and, with the exception of the rough playing of La Doo, who tackled two Stevens men when outside the lines and threw them, the game ended very pleasantly, the score standing 0 to 0.



The literary criticisms of the *Princetonian* form an interesting part of its columns.

We hope the *Burr* and the *Targum* will no countenance any more discussions about the merits of their *past* football attainments. Our college should not sneer at another, and in return we should put as charitable a construction as possible upon the criticism of our fellow collegiate papers.

We always welcome the *Northwestern*, as it always contains something of general interest and high merit. The paper now presents a neat appearance and fine typography and we would discourage the proposer's scheme to have the paper printed by the students. We cannot conceive how it would be possible for any students to find the great amount of time which it would be necessary to expend in this work. For the sake of your paper, and for the sake of your studies, let the new scheme be dropped.

* the *

Stevens Indicator

Vol. 5

December, 1886.

No. 17.

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THE MECHANICAL ENGINEER

OPENS SEPTEMBER 17, 1886.

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THE Stevens Indicator.

Vol. 3.

HOBOKEN, N. J., DECEMBER, 1886.

No. 9.

"NIPPED IN THE BUD."

A daring young freshman at Yale,
On the banjo tried to prevail;
From A. M. till night,
With zeal and with might,
He thrummed till endurance must fail.

* * * * *

There is quiet by night and by day:
Would you like us the wherefore to say?—
Well—he raised such a din,
That we sophomores dropped in,
And he's climbed up the golden stairway.
—*Yale Record.*

A SKETCH OF EDISON'S LIFE.

A person engaged in the study of the lives of our great men, cannot help being impressed with the fact, strange as it may seem, that only a very few of them ever received more than a limited high school education, most of them, in fact, having received so little that to call them entirely self-educated would be no more than a just tribute to their greatness. Some from lack of means, others from lack of desire, but whatever the cause we find the majority of our presidents, statesmen, scientists, inventors, etc., untaught, except in so far as they seem to have an inward monitor who guides and directs them into the proper channel for the acquiring of knowledge, and the display of it to those who may spend a large number of years in a college and yet never possess the much desired "greatness."

Among the large number of self-made men, Thomas Alva Edison stands out among the very foremost, for though born into this world with less than moderate circumstances, he soon makes a high place for himself, aided only by his indomitable courage, unflagging energy, and his seemingly inexhaustable brain force.

His mother, a Scotch woman, and his father a Dutchman, lived in a small town, Milan, Erie County, Ohio, at the time of his birth, which took place Feb. 11, 1847. At a very early age he was thrown upon his own responsibility with only eight weeks of common school education; this, however, was sup-

plemented with help from his mother who encouraged his taste for reading, and so we find that by his twelfth year he had read besides Hume and Audibon, a great deal of the Penny Cyclopædia. His love for reading and thus acquiring knowledge, together with his insatiable liking for chemistry led him to determine to read every book in the public library of Detroit, and in carrying out this determination he even went so far as to read Newton's Principia, the Dictionary of Science, by Ure, and as an enjoyable "top dressing" Burton's Anatomy of Melancholy.

On acquiring a monopoly of the "news agency" on the Grand Trunk railroad he opened up for himself a large field of reading matter; this not employing all of his time he improvised a laboratory in one of the cars, but by the untimely explosion of some chemicals the car was set on fire and the whole train so much endangered that the conductor threw both the boy and his apparatus out of the car. Nothing daunted, the boy collected a lot of type and began to issue *The Grand Trunk Herald*. His evenings being at his disposal he enthusiastically took up telegraphy, becoming so proficient that in a short time he operated in Port Huron, Mich.; Stratford, Canada, and Adrain, Mich., at which place he established a shop for repairing telegraph instruments and the manufacture of other instruments. His next move was to Indianapolis. Here he invented his automatic repeater for transferring a message from one wire to another without the services of an operator. After traveling a great deal from city to city he went to Cincinnati, and at the age of twenty became known as a successful inventor. But being in such demand he spent much time in Boston and between Rochester and New York. He was now engaged in perfecting his inventions; to this effect he employed about 300 hands at an establishment in Newark, N. J., but on finding that the superintendence of this took up too much time he gave it up and established in 1876, an experimenting establishment at Menlo Park; this place has become the Mecca of all persons interested in lighting by electricity. In

1878 at the age of 31 years, Edison created a great sensation among the leading European scientists by the exhibition of his Phonograph at the French Institute. This exhibit was followed up in 1881 at the Paris Electrical Exhibition, at which place could be seen his system of electric lighting by incandescence, his disc dynamo-electric machine, also a micro-tasimeter, which is used to measure the smallest change in temperature, an odoroscope which renders visible the presence of certain essential oils and hydrocarbon vapors and registers their action, then the electromotograph which reproduces the human voice at a distance, and as a climax one of his most wonderful inventions is the quadruplex system of telegraphy, by means of which four messages can be sent in opposite directions and be perfectly transmitted over the same wire. In all, Mr. Edison's inventions amount to about 200, and being still a very young man we may look for many more testimonials of his marvelous inventive genius.

C. E. H.

THE INDICATOR'S PROFESSION.

Three years ago the STEVENS INDICATOR came into the world, and as it was the first-born, all the family pride centered in it. To be sure, its elder cousin, the *Eccentric*, had preceded it by ten years; but the *Eccentric* had passed through childhood and was settled in its own useful corner of life's busy arena. The INDICATOR, however, was of a vacillating temperment, now interesting itself wholly in athletics, now with childish thoughtlessness annoying its god-fathers, the faculty. How tenderly this scion of a noble house was reared! How troubled were its friends at its sudden manifestations of wrath and folly! How little it cared for serious thought! Yet now and again it astonished everyone by its precocity, by the lurkings of power within it.

Like many young men, the INDICATOR hoped to obtain the aid of some influential relatives when it came time to start out in life; but as the time drew near the alumni showed no interest beyond asking if the youth was well, and moralizing upon the constant care required to train up such a headstrong and friendless boy. Not for one moment, however, did the parents despair. The less interest the relatives showed, the more the parents sought to gain their favor though the intrinsic merits of the child.

The momentous hour had arrived when the choice of a profession must be made. At first seemed as though the INDICATOR inclined

toward journalism—one moment it aped the *North American Review*, the next it condescended to be pleased with *Puck*, *St. Jacob's Oil Almanac* and the *Mechanical Engineer*. Yet, withal, its fondness for science was of no mean order, and in its inexperienced way it sought to observe and to explain. Candor compels me to confess that at this age the youth was self-asserting and erratic; but the first was caused by the stern necessities of an almost friendless existence, while the latter arose from the vain endeavor to be all things to all men and thus gain a few friends.

When the INDICATOR's parents asked their kindred, the alumni, for advice and assistance, the reply was: "If you will make a scientific man of him and let us join forces in starting him in life, we will see to it that financial support is not wanting to make him a success." What reply was to be made to this liberal offer? Could it in justice to the youth be rejected?

I have just returned from an interview with one deeply concerned in the welfare of the INDICATOR. Next month, he tells me, the professional duties are to begin. The profession chosen is that of mechanical engineering. The alumni are numerous and influential; surely success will crown their undertaking.

RAILWAYS OF EUROPE IN 1884.—The total length of railways opened for traffic at the end of the year 1883 amounted to 113,716 miles. At the end of 1884 the length open was 117,633 miles, showing an increase of 3,937 miles opened in the course of 1884, or 3.46 per cent. of the total length at the end of 1883. 515 miles were opened in Germany; 776 miles in Austria, Hungaria; 256 miles in Spain; 933 miles in France; 208 miles in Great Britain and Ireland; 313 miles in Russia and Finland. —*Van Nostrand's Engineering Magazine*.

A NEW PROCESS for making steel pipes is employed at Burbach, Germany; as soon as the steel is cast into the round mould, a core is thrust into the steel, so that a tube is formed between it and the walls of the mould. In order to prevent cracking of this annular casting during cooling, the core is so made that it follows up the shrinkage of the steel. The steel cup thus obtained may then be rolled in an ordinary train. It is stated that a large firm in Paris proposes to apply the method to the manufacture of copper tubing. —*Scientific American*.

THE STEVENS INDICATOR.

THE FIRST LOCOMOTIVE FOR AMERICA.

The following verbatim extract from the "Description Book, 1831," gives the leading dimensions of the first engine ordered for use in the United States. The description was probably copied from an older book, and was apparently written in 1831. Mr. Allen has stated that he believed this engine, which he ordered from Stephenson, to have been the first with a multitubular boiler, as distinguished from the older engines with a single or a return flue. While Stephenson had faith in the multitubular boiler, he could not persuade his countrymen to order a boiler of the new type, but Horatio Allen, with characteristic American disdain for mere precedents, gave Stephenson an order for the first multitubular boiler used in a locomotive. It will be seen, however, that this boiler hardly deserved the name of multitubular, as it had only two so-called tubes, each 19 in. diameter. Mr. Allen has stated, however, that "the only points decided by me were that the boilers of the locomotives built by Stephenson & Co. were to be multitubular boilers, the dimensions of the tubes to be decided by the builders. Mr. Allen further states that the engines were built after he left England, and that he never saw the inside of the boilers. Stephenson appears to have had less confidence in the multitubular boiler than Mr. Allen, and therefore built the boiler with two flues instead of numerous tubes. The following is a verbatim copy of the description:

No. 12, Allen's engine constructed in 1828:

Boiler.....4 ft. 1 in. X 9 ft. 6 in.
 Fireplace.....4 X 3
 Cylinders.....9 in. X 2 ft. 0 in.
 Chimney.....1 ft. 8 in.
 Pumps.....1 1/2 in. X 2 ft. 0 in.
 Wheels.....Wood.
 Diameter.....48 in.
 Number.....4
 Angle of cylinders from the horizontal.....33°
 Size of tubes.....1 ft. 7 in.
 Number.....2
 Straight.

This was the twelfth engine built by Stephenson. The nineteenth was "the Rocket," Liverpool prize engine, constructed 1829.

The seventeenth was constructed for Major Whistler, and was somewhat similar to Horatio Allen's engine, but had six wheels and a return flue.

The "Rocket" is described as follows in the old "Description Book" referred to before:

Boiler.....3 ft. 4 in. X 6 ft. 0 in.
 Fireplace.....2 ft. 7 in. X 2 ft. 0 in.
 Cylinder.....8 X 17
 Chimney.....1 ft. 2 in.
 Pump.....1 1/2 X 17
 Wheels, two.....4 ft. 8 in.
 Wheels, two.....2 ft. 6 in.
 Angle of cylinders from the horizontal.....35°
 Weight without water.....3 tons 9 cwt.
 Weight of water.....13 cwt.
 Tubes.....copper.
 Size of fire tubes.....3 in.
 Number.....25
 Circumference.....9.424
 Area.....7.068 sq. in.
 Distance, centre to centre.....4 1/2 in.
 Cylinders, centre to centre.....5 ft. 9 in.
 Wheels, centre to centre.....7 ft. 2 in.
 Depth outside from bottom of boiler to bottom of fire-box.....1 ft. 3 in.
 Super area tubes.....13 sq. ft.
 Axles, diameter to middle.....3 1/4 in.
 Single slide valve.
 Observations.
 Outside horizontal cylinders.

The "Rocket," therefore, in spite of Mr. Horatio Allen, appears to have been the first multitubular locomotive. Mr. Allen's possibly was the first in which two large straight flues were used instead of a single or a return flue.

A memorandum dated July 23, 1828, made apparently by Mr. Allen, evidently refers to the sharpest curve on the line on which his engine was to travel: "Sharpest curve on main line side to chord is 1:60."† The chord was presumably the wheel-base of the engine, but the whole entry appears somewhat vague, and only shows that the question of passing round a curve had been considered.

The old drawings show that several points about locomotive practice are of older date than is generally imagined. The following shows the earliest dates at which the several devices named appear in the drawings:

Driving axle-box wedges.....about 1831
 Cylinders inside, centre line being below front axle.....1831
 Circular side valves.....1832
 Deflectors in front of tubes.. }
 Cork placed in bottom of exhaust pipe to diminish violence of exhaust..... } Engine "Goliath," 1835
 First link motion.....1842
 Four-cylinder engine, similar to Shaw's and Haswell's.....1848
—R. R. Gazette.

* This is equal to a 7 deg. 38 min. curve.

GEORGE STEPHENSON.

The "Father of Railways" he is called, and although a merited and justly applied title, we do not at first appreciate the rare honor conveyed thereby. The railway is the most wonderful link in the history of civilization, and through it was introduced the present Age of Steel. He, therefore, to whom the railway owes its existence, is one whose name should be held in the highest honor by all of us who are now profited by the results of his labors. George Stephenson rose to his position by his own resolute efforts, which conquered all difficulties and prejudices. He was born in Wylam, a colliery village, near Newcastle, England, June 9, 1781. His father was employed as fireman of the pumping engine used at the Wylam colliery. Earning but twelve shillings a week, he was too poor to send his children to school, and so the boy, at the age of eight, was put to work herding cows, receiving two pence a day. He amused himself here, on the banks of a brook running through the field, making miniature clay mills and engines, with stems of hemlock for imaginary steam pipes.

He was not content, however, to continue where he could learn so little, he wanted to be working with men at the colliery, and so found employment as driver of the "gin" horse at the pit. When fourteen years old he obtained a position as assistant fireman under his father, at a shilling a day, and at seventeen he was promoted ahead of his father, to be engineman of the pumps at the mine. His perceptive faculties were keen and active, and desiring to know everything about his engine, he often took it to pieces to clean and examine, until he had it in perfect order and understood its action thoroughly. He could not at this time read, and hearing so much about the engines of Watt and Boulton, he wished to know all about them, and so made up his mind to learn to read. He took lessons in reading and spelling at a night school, and soon afterward commenced arithmetic. His progress in study was wonderful, because his earnestness was intense, and he spent all his spare time in the engine house "summing." At twenty years of age he was earning twenty shillings a week, to which he added, by shoemaking and by mending clocks and watches for the neighbors. His study of engine machinery enabled him to remedy the defects in the pumping engines and winding machinery in the neighborhood, so that he came to be called "engine doctor."

In 1802 he was married, and took a small cottage with a bit of ground attached. Here his famous son Robert was born. The father, knowing how deficient his own education had been, determined that his son should not labor under the same disadvantage, and so sent him at the age of twelve to school. Robert was fond of reading all the scientific information he could get, and in the evening he would give to his father the results of his reading. As long as his father lived, this co-operation in study and work continued.

Up to this time several locomotives had been made for hauling coal, but in every case had failed to prove themselves equal even to horses. George Stephenson desired to do for the locomotive what Watt had done for the steam engine—to produce an efficient and economical machine. To do this he studied all the existing forms of locomotives, with a view to discover the causes of their failure and to remedy the defects. In 1815 he brought out a locomotive in which the connecting rods were joined directly to the cranks of the driving wheels without the intervention of gearing, and the wheels were provided with smooth tires. He had observed the greater velocity with which the waste steam escaped from the cylinders of engines as compared with that of the smoke from the chimney, and therefore in this locomotive he conveyed the exhaust steam into the smokestack, producing a draft through the fire. This last improvement decided his success, and from this time, 1822, dates the history of the locomotive proper. This engine, with four others, ran successfully, each hauling sixty-four tons of coal at the speed of four miles an hour.

Not long after the Stockton and Darlington Railway was begun, George Stephenson being appointed engineer of the line. By long persuasion he was able to convince the railway company of the practicability of steam locomotion, and a manufactory was established at Newcastle for the purpose of making locomotives. Here he built a locomotive with which to operate the line. As the time drew near for the completion of the work, Stephenson said to his son: "I venture to tell you that I think you will live to see the day when railways will supercede almost all other methods of conveyance, when mail coaches will go by railway, and the railroads will become the great highways. The time is coming when it will be cheaper for a working man to travel on a railway than to walk on foot. I know that there are great and almost insurmountable difficulties to be encountered, but what I have

said will come to pass as sure as you now hear me. I only wish I may live to see the day, though that I can hardly hope for, as I know how slow all human progress is, and with what difficulty I have been able to get the locomotive introduced thus far, notwithstanding my ten years successful experiment." The railway was opened in 1825, George Stephenson himself running the first engine, "Locomotion," which attained a speed of twelve miles an hour with a load of about ninety tons.

The Liverpool and Manchester Railway was then projected. The work of laying out the line was given to Stephenson, who met with opposition in every way. Threats of violence from the common people, legal hostility, ridicule and personal insults in the court, were brought against him, but to use his own words: "I put up with every rebuff, and went on with my plans, determined not to be put down."

The road completed, the question was how it should be worked—whether by horses, stationary engines, or locomotives. Stephenson stood almost alone in favor of the last against nearly every professional man of eminence. Nevertheless he persevered, and finally, under his persistent assurances that locomotives would do more than the requirements of the road demanded, it was decided to adopt them, provided certain conditions were fulfilled in a trial at a fixed date. George and Robert Stephenson, at their works in Newcastle, built for this trial the celebrated "Rocket." The trial took place in October, 1829, three other engines being entered, but these three failed utterly, while the "Rocket" even exceeded the requirements for speed. This at once secured the triumph of the railway system. In 1830 the road was opened with a new locomotive "Rocket," running at the rate of twenty and thirty miles an hour.

The firm of Stephenson & Son was now famous. Railroads were being started, and orders came from all sides for locomotives. The "John Bull," brought to this country for the Camden and Amboy Railroad, was built by them in 1831. They were busy men, and were rapidly accumulating wealth. A large brick mansion, surrounded with woodland and pleasure grounds, was chosen for their residence, and at the age of sixty George Stephenson retired from business, leaving his son Robert in full career as a railway engineer. He died August 12, 1848, in the sixty-seventh year of his age.

Both the Stephensons, father and son,

were remarkable men—men whom this age delights to honor. Well may they have refused the honors of knighthood, which were tendered to each of them, for they themselves were royal powers upon earth, conferring knighthood and dignity upon all human labor."

ALBITAN.

SLIGHTLY MISTAKEN.

"O woman, in our hours of ease,
Uncertain, coy and hard to please"—
The Junior with a smile the book away
From him did cast, as idly still he lay
Upon a bank beneath the proud pine trees
Which seemed to whisper with the passing breeze,
While all around him peaceful, calm there lay,
All faint in the soft haze of summer day
The fair green fields and cool and spicy grove,
Where he with fellow students loved to rove,
Oft as beneath the stars his way he took,
Free from his college duties and his book.
With that soft, loving pressure on his arm
Of her, whose presence lent a heightened charm,
To all that lovely scene and starlit night,
For May doth give us mortals her moonlight
For love, as old Dan Chaucer sings aright.

From off the campus came to him the call
Of classmates at their tennis and their ball.
While far beyond them all he could survey
Where Mohawk's silver in the distance lay.
Off to the left their rugged heads upraise
The Helderbergs, all wavy in the heat,
Whose utmost tops the fleecy clouds did graze
As though they loved their craggy mountain seat.

While thus he lay, his musing from him broke
And thus communing with himself he spoke—
"O woman, in our hours of ease,
Uncertain, coy and hard to please"—
I have not found *her* so; she seemed to yield
The moment that I came upon the field.
Her brown eyes seemed to brighten when I came,
Her smile to others never seemed the same.
She is completely gone without a doubt.
But surely I must for myself look out,
I wish to leave no college widow here;
And then—for that—she's much too sweet and dear."

As thus he mused his reverie was broken;
He raised his head to hear a sentence spoken
In a familiar voice and—"Hateful sight!
It cannot be. My eyes don't see aright.
'Tis she; But who is he that by her side,
With stately air and Senior's stride
Doth stalk? And what doth glisten on her breast?
Ye gods! His pin, or else may I be—blest.
While she attentive, with that self-same smile
Doth listen to *his* senseless talk and praise
Of Union. Ever and anon, the while,
Those dark brown eyes so shyly bright she'll raise
Whose beauty would an anchorite beguile
To sing the lovely languor in their gaze.

L'ENVOI.

"All that glitters is not gold,"
And sometimes e'en a Junior's sold.—Ex.

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The editors do not hold themselves responsible for opinions expressed in literary articles or communications.

INASMUCH as this is the last issue of the INDICATOR under the present management, some of the members of the company have considered it of small importance that they should fail to contribute acceptable articles, or even anything at all, giving as excuses the same old chestnut, "haven't had time." They have certainly more time than those who have to undertake a double share of this work, and are only taking advantage of the present condition of affairs to shirk their work, with as much to say, "What are you going to do about it, anyhow!"

WE have received a contribution entitled, "The Marking System;" a subject which has been "aired" rather too extensively to deserve publication in the columns of the INDICATOR. In it the author condemns the marking system of our college in no small degree, claiming that many *men* are deterred from asking questions on points concerning which they are very doubtful, for fear of betraying their ignorance on such, and consequently being marked low for it.

Mr. B—— is evidently one of those fellows who would like to ask a question now and then, but does not for fear of the above result; his apparent opinion of himself is, that his general standing in college is too low to permit him to run the risk of getting these *low marks* without exposing himself to the danger of a "side door graduation." But he does himself an injustice, for a low mark on such a point in an examination would count against one far more than if the matter was made clear during the term, even though a zero was all the credit he got for showing a desire to learn. Mr. B—— advocates abolishing the term mark, and depending on the examination alone to decide whether or no a man is to be passed or conditioned. This would result in putting a premium on cutting recitations and lectures, as if true marks are not to be included in a man's standing. Mr. — should have been explicit in the exclusion of the "second head" of the panorama style. We can, however, state that if a *man* who enters Stevens with the intention of learning all he can, is desirous of being informed on any point, he will not be restrained from asking about it for fear of a low mark in consequence.

—♦♦♦—
A FEW lines in regard to lathe exercise, appearing in the Stuffing Box of our October issue, has been noticed by other papers to the extent of reprinting the same. It is a well known fact that the students of every college always find some subject about which to make fun or else to "kick against."

often than not these troubles are more half fancied, or better, the student is not as he thinks he is, and his fun making shows that he fails to take into consideration all the facts of the case. All publications should therefore exercise great care and acquaint themselves thoroughly with the facts before publishing anything from the undergraduate papers of our colleges which seem to reflect upon their good standing and management.

The intended hit upon lathe exercise is an example of the above mentioned fact. In the first place the price charged for castings is referred to. If one takes into consideration the price of *small* castings from the foundry, the expenses of carting, sorting, weighing out and keeping account of the same, one will at once see that the prices are nothing more than fair. In the next place, it is the student's own fault if he leaves his completed exercises lying around to be used by some one else. He has bought his material, and can preserve his completed exercises or sell them to another student or for old iron. The fact of the case is, that the students are at liberty to purchase their material anywhere they wish. Mr. Hawkridge provides for us, keeping in stock constantly, at fair prices, at the time and place we want them, for various exercises. In fact, the accommodation is so apparent that a student never thinks of purchasing elsewhere. We hope, if strong impressions have been made, that the explanation will set things straight.

ENGINEERING NOTES.

The production of copper throughout the last year, is estimated at 221,715 tons, as compared with a corresponding production of 133,000 in 1884, and 153,057 in 1880. The copper producing countries last year were: Australia, 11,400 tons; Chili, 38,800; Peru, 15,250; Japan, 2,000; Spain and Cuba, 45,949; and the United States, 74,000.—*Electrical Review*.

THE ELASTICITY OF METALS.—M. Tresca lately published in the *Comptes Rendus* the results of observations made as to the effect of hammering, and the variation of limits of elasticity as regards metals and other substances used for technical purposes. Hitherto it has been usual, in considering the deformation of solid bodies under the influence of extensile forces, to recognize only two definite periods, dependent upon the mechanical properties of the substances in question. These periods are the limit of elasticity, and the point of laceration. M. Tresca has found it necessary at the end of the period where the change of elasticity commences, to recognize a third stage, which may be described as a period of fluidity and which corresponds with the possibility of a continuous deformation under the constant effect of the same tension. This peculiar condition may be regarded as a characteristic of substances of a very extensible or plastic nature, as its absence is noticed in materials that are brittle and which are fractured without previous deformation. It is already known that the period of alteration of elasticity is much shorter in hard or hardened steel than in iron. M. Tresca protests against the expressing of the prolongation of metal bars produced by burdens in the form of a percentage of their length. Such prolongations are, he urges, always specially local, and consequently the same in long and short bars, being limited by the proximity of the point of fracture. The indication of elasticity should, therefore, rather be sought in the diminution of the section of the bars at the point of fracture. This portion of a lacerated bar is further remarkable for the loss of the original state of its material composition. At the point of fracture the substance has become remarkably condensed, and has almost entirely lost its toughness. The final fracture, therefore, takes place in a brittle zone of the metal, and the same condition can be produced by hammering. If a test bar, which has been extended almost to the point of fracture, be thoroughly heated, it can be still further extended before it breaks, and it is really a fact that by alternate stretching and heating, such a bar may be extremely changed in its proportions, as is, for instance, the case in wire drawing.—*Industries*.

The *Electric Review* explains the new method of protecting iron, which has been brought out by M. Ade Meritens. The article

to be protected is placed in a bath of distilled water at a temperature of from 158 to 176 degs. Fahr., and an electric current is sent through. The water is decomposed into its elements, the oxygen being deposited on the metal, while the hydrogen appears at the other pole. The current has only sufficient electromotive force to overcome the resistance of the circuit and to decompose the water; the oxide, formed under such conditions, is the magnetic oxide which resists the action of the air and protects the metal beneath it. After the action has continued an hour or two the coating is sufficiently solid to resist the scratch brush, and it will then take a brilliant polish.

In order to obtain a coating on articles of wrought and cast iron, the order of operations has to be reversed. The iron is placed at the negative pole of the apparatus after it had been already applied at the positive pole. Here the oxide is reduced, and hydrogen is accumulated in the pores of the metal. The specimens are then turned to the anode and their solid coatings treated in the same way as those of the steel articles.

PERSONALS.

Under the new management THE INDICATOR hopes to make the personal department very interesting. To attain this end the hearty co-operation of the alumni and students is necessary. It is therefore requested that all items of interest relating to past and present students be sent to the Personal Editor.

A. P. Trautwein '76 and A. Spies '81, have been elected Alumni Editors on THE INDICATOR.

'80.

Durand Woodman has left the United States Electric Light Co., and has opened an office as analytical chemist.

'83.

Morgan Brooks is with the Electric Accumulator Co., Boston.

H. A. Hickok has left the Wallis Iron Works to accept a more lucrative position. His present address is unknown to us.

'84.

D. H. Maury accompanies his father, U. S. Minister to United States of Columbia, to that country, where he will receive orders for American machinery.



Where is the football team? Did Stevens put a team in the field this season? were the questions with which several individuals were plied after the return game with Lafayette? In reply, it may be said that Stevens had a team in the field, but met with defeat on all sides. Such a score has not been made since the existence of the INDICATOR, at any rate. In some cases the team did excellent work, as, for instance, in the Princeton games; but, on the other hand, the general playing was characterized by such blunders that the total points scored in eight match games was *for* against 290! Lafayette, however, is only turning the tables on us; for two years ago the score was 58 to 0 in favor of Stevens. One thing, however, is entirely inexcusable, and that is the failure to play the match arranged with the University of Pennsylvania. It is the first time that such has occurred; let us hope it is the last.

Everybody at Stevens knows the reputation Rutgers has as regards arranging dates for football matches—not an enviable one, certainly. Will not U. of Pa. regard Stevens in the same light?

The football season is generally considered to end with the games on Thanksgiving Day, and on that account considerable blame should be attached to the board of directors of the Athletic Association for fixing such a date for this match with Pennsylvania, knowing as they ought to how extremely difficult it frequently is to get a team together on ordinary occasions to play a match out of Hoboken, much less on the Saturday after Thanksgiving.

“I see the scoundrel in your face,” exclaimed the judge to the prisoner. “I reckon, jedge,” was the response, “that that ‘ere’s a personal reflection, ain’t it?”—*Student Life*.



ing, going, gone! What? Why, the Indicator Publishing Company.

gives us one more variation to the much loved "Gray's Elegy." Thanks!

W. (addressing student at the board): "is *this* at the board?" Student feels and class indulge in uproarious laughter.

demoralization of the foot ball team unfortunate as it was complete. Stevens scored 6 points against 316. !!!

College, Cornell University, is now popular resort for unfortunate Stevens quite a colony having taken up their abode there during the past six months.

born, '87, has been compelled to leave college on account of trouble with his back which it is feared will become serious. Next term he will be with us again.

Following men have been selected by the Editorial Board of Editors of the INDICATOR to constitute the undergraduate members of the new board: Kiernan, '87; Wynkoop, '88; Jackson, '89 and Lawrence, '90.

Illness of Prof. Mayer has been more serious than was at first supposed. He has been suffering from an attack of typhoid fever, but is now slowly regaining his strength, and earnestly hoped that his recovery will be speedy.

If you want to see a perfect "jam," just look into the Chemical Laboratory on Tuesdays or Fridays and see the Seniors at work. Why the place is full to overflowing with seniors. It is surprising how so many work there together, is it not?

It is simply delightful to see how much the German man in '87 knows about German. Every day, an '87 man was heard to accost a recent son of Germany with the expression "speaken sie English." The "innocent" failed to connect. No wonder.

A short time since, a Junior before explaining some work at the board, announced that he was going to give a modification of "the other valve," there being about six hundred valves, more or less, to select from. The Juniors have always been noted for their lucidity anyway.

We have heard of "egg plant," "pie plant," and several other kinds of plants, but we never heard of a "lager beer plant" until the other day, when a senior took us aside and told us in the strictest confidence that a brewery is a "lager beer plant." Two of the board contracted brain fever on the spot.

The other day, a very small "Prep." was heard warbling the following through the halls of the Institute:

The curfew tolls the knell of parting day,
The lowing herd winds slowly o'er the lea,
And from the field the ploughman sneaks away,
To get a drink at the brewery.

If after the appearance of this issue, there is seen on the campus half a dozen individuals turning hand springs and giving evidence of great and unbounded joy, you may know that they are the members of the Editorial Board of the INDICATOR, who having completed this, their last issue, are made temporarily insane by the tremendous strain being thus suddenly removed from their minds.

When the INDICATOR publication was dissolved it consisted of the following:

Carter H. Page, Jr., '87, President; Thorburn Reid, '88, Vice-President; Hubert S. Wynkoop, '88, Secretary; Arthur H. Fuller, '88, Treasurer; Franklin Moeller, '87; Burton P. Hall, '88; John V. L. Pierson, '88; Robert G. Smith, '88; William W. Schenck, '88; Thos. A. Van der Willigen, '88; George B. Muldaur, '89.

Prof. Albert R. Leeds, who has recently returned from an inspection of the great public water works of England and Scotland, read a paper on "The Purification of Water Supplies" before the New York Academy of Sciences, in Hamilton Hall, Columbia College, two weeks ago. Prof. Leeds said he favored aeration as the most feasible method, with filtration, when a proper means should be found.

The Senior class has been actively engaged for some time past in discussing commencement exercises. For that purpose the follow-

ing have been appointed to constitute the class day committee: Page, Flack and Anderson. Commencement committee: Moeller, Hart, Firestone, Quimby and Serrell. It was also decided to have a nominating committee, for the purpose of choosing the orators. Nominating committee: McElroy, Beard and Quimby.

It pleaseth the hearts of the staid Seniors and the worthy Juniors to observe the Freshmen toil in the shop. The avidity with which they toil is likened greatly to the avidity with which the Juniors do anything else but toil. Fret not thyself because of these things however. The Freshman is young and tender; he waxeth old, he waxeth also wise, and soon will he see the folly of his ways. And when it comes to pass thus, he will "cut" every other day and tarry long on one exercise.

The class of '90 appears to have a very enjoyable time on the whole, judging from the sounds of revelry that issue from its class room at all hours of the day. The musical element seems to predominate among its members and they are evidently not of the kind who are at all backward about using the talents which they possess. It is a fortunate circumstance that such is the case, as the musical clubs which have previously existed in the Institute, are rapidly becoming lifeless. It is hoped that '90 will infuse new life into these warring organizations, and give them the prominence which they deserve.



The *Princetonian's* advertisement column of "Lost and Found" seems to be well patronized.

"The President of the Sophomore Class has given \$500 to the gymnasium fund." Phew! Our Sophomore President didn't pay as much as that for his election.

The Lippincott Publishing Company is offering prizes for articles on social life at Vassar, Yale and other prominent colleges. If we were one of the aforementioned prominent colleges, how our famous class-room riots would amuse the outside world!

The *Pleid* contains an account of the advantages offered by the Biological Laboratory at Annisquam, Mass. This is replete with such beautiful Latin names as *Lopothuria Fabricii*, *Lunatia heros* and *Holothuroidea*. Of course we all hold their *oidea*. Don't offer such provocation again, please.

Lafayette exchanges are very personal. "In our intercourse with old and new friends, perhaps it would be well to

'Be to their faults a little blind,
And to their wishes very kind,'"

as Sybil well reminds us.

The Vassar *Miscellany* contains a five-page review of the "Strange Case of Dr. Jeckyll and Mr. Hyde;" also an essay on "The Mission of Wagner," in which occurs the word *Gotterdammerung*. Oh, girls! But perhaps this has some connection with several other expressions which only a musician can be expected to understand.

Madisonensis, in an article on the poetry of Benjamin F. Taylor, class of '38, states that Mr. Taylor is a poetic Burroughs. We clip a few lines from "How the Brook Went to the Mill":

A nameless rill * * * * *
* * * * *
* * * crept away in the tangled grass
With a voiceless flow and a wandering wilt,
The Wish-ton-wish of a silken dress,
The murmured tone of a maiden's "Yes!"
* * * etc.

In the *Mechanical Engineer* we notice an appeal, by William E. Kent, M. E., for the formation of a new engineering society to be formed of "Men Who Have Done Something." A bright idea. We see that an attempt is also being made to form a "Society of Stationary Engineers." A paper read two months ago in England on "Triple Expansion Marine Engines," is an interesting article at the present time. Through the columns of the *Engineer*, a gentleman connected with the wrecking company which was engaged on the Oregon wreck says: "It doesn't take much of a storm to make itself felt sixty feet down, where the Oregon lay, as our divers were fully satisfied."

The *College Mercury* always contains a great amount of college news. We suppose you are in some way excusable for admitting an article on the "Marking System," but the subject is a terrible "chestnut."

THE MECHANICAL ENGINEER.

Words by W. F.

Music by E. S.

f

INTRODUCTION.

1. A frolicsome life, without care or strife, The American students
 2. The hammer he swings till the anvils ring, And swings his girl in the
 3. He breaks every rule, and breaks every tool, And oft his promise

mf tempo legato.

lead; Though the purse be slim, and the governor grim, Still never they stand in
 dance; The iron he rolls and casts it in moulds, And oft casts an amorous
 breaks; He breaks many hearts, when ever he departs, And his tender friends for -

ritard.

need. With everyone's trust they go on a "bust." I fancy the matter clear—
 glance. With wonderful zeal he tests any steel, And tests the love of his dear—
 sakes. He turns every brass, and mind of each lass, I fancy the matter clear—

p a tempo. *crescen. e poco ritard.* *f*

THE MECHANICAL ENGINEER.

CHORUS.

That too is the go with the fine em - bry - o me - chan - i - cal en - gi - neer, That
too is the go with the fine em - bry - o me - chan - i - cal en - gi - neer.

STEVENS.

SOLO.

CHORUS.

SOLO.

1. When first we came to Stev - ens Hall, Fol de rol de rol rol rol, Ex - am - i - na - tions
2. In Freshman year we pass the days Fol de rol de rol rol rol, In get - ting used to
3. As Soph - o - mores our minds turn sour, Fol de rol de rol rol rol, From cramming "Roscoe"
4. In Jun - ior year we toil and toil - Fol de rol de rol rol rol, But ne'er our hands with
5. In Sen - ior year we take our ease, Fol de rol de rol rol rol, We smoke our pipes and
6. The sad - dest tale we have to tell, Fol de rol de rol rol rol, Is when we bid Ste -

CHORUS.

made us crawl. Fol de rol de rol rol rol, S - t - e - v - e - n - s,
Stev - ens ways.
hour by hour.
shop-work soil.
sing our glees.
vens fare - well.

Fol de rol de rol rol rol, S - t - e - v - e - n - s, Fol de rol de rol rol rol.

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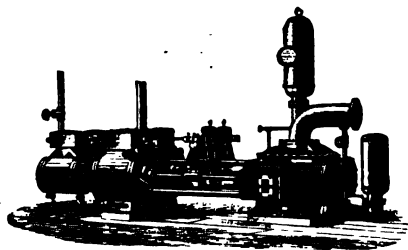
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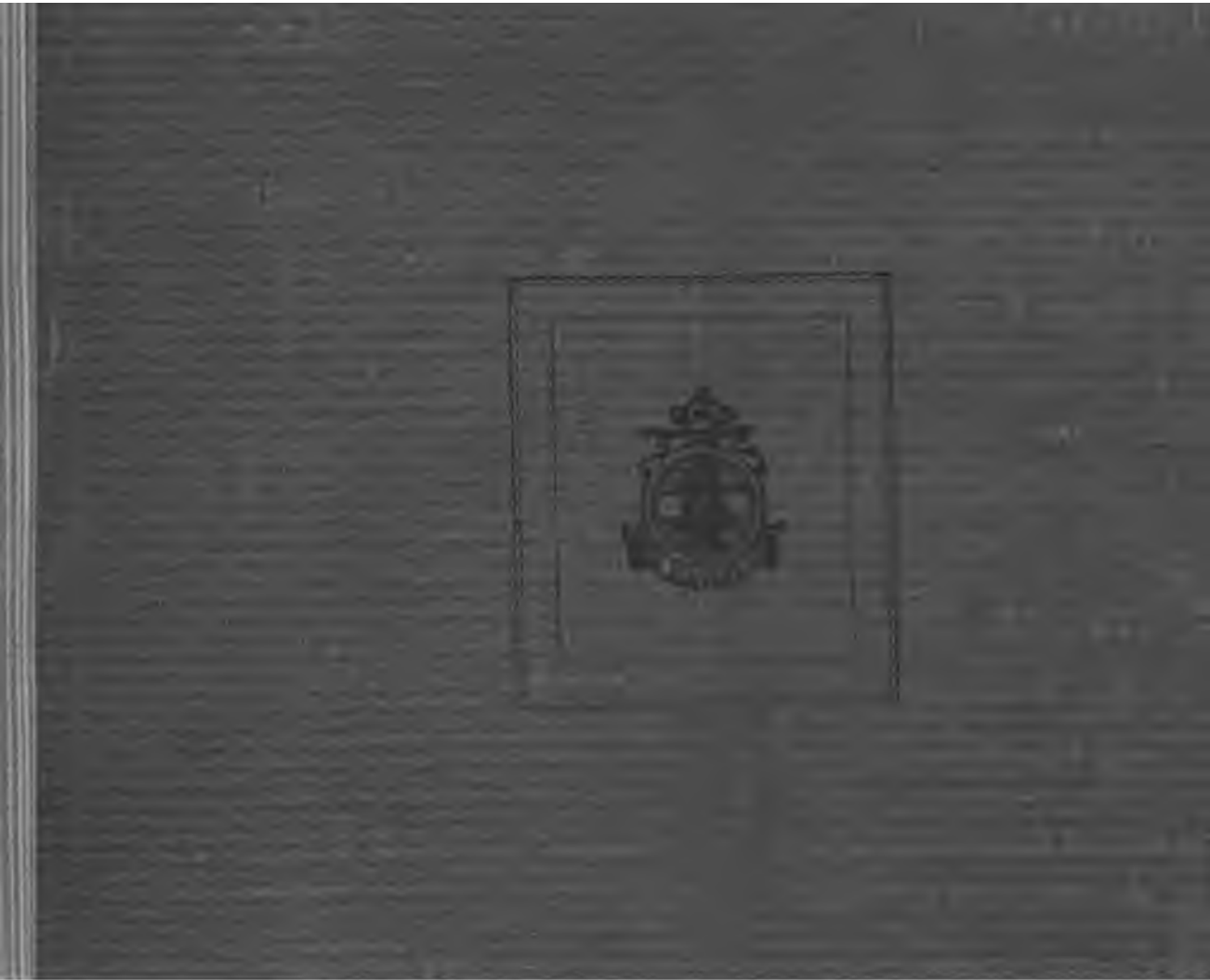
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